Historic, archived document

Do not assume content reflects current scientific knowledge, policies, or practices.

THE PLANT DISEASE REPORTER

U. S. HORTICULTURAL STATION
RECEIVED
☆ MAR 27 1941 ☆
LIBRARY
BELTSVILLE, MARYLAND

Issued By

The Office of Plant Disease Survey
and
Pathological Collections

Supplement 41

Diseases of Field and Vegetable Crops
In the United States in 1924

June 1, 1925

BUREAU OF PLANT INDUSTRY

UNITED STATES DEPARTMENT OF AGRICULTURE

DISEASES OF FIELD AND VEGETABLE CROPS IN THE UNITED STATES IN 1924.

Prepared by

R. J. Haskell, Associate Pathologist,
Plant Disease Survey, Bureau of Plant Industry.

Plant Disease Reporter
Supplement 41

June 1, 1925.

CONTENTS

- Introduction 193
- Mosaic diseases 194
- New diseases 195
- Potato 196
  - Late blight 196
  - Early blight 201
  - Scab 203
  - Blackleg 207
  - Stemrot and scurf 208
  - Wilt 211
  - Wilt and stem-end rot 212
  - Bacterial wilt 212
  - Wart 212
  - Mosaic 213
  - Leafroll 215
  - Spindle tuber 217
  - Other degeneration diseases 217
  - Yellow dwarf 218
  - Tipburn and hopperburn 218
  - Other non-parasitic diseases 219
  - Other parasitic diseases .. 220
  - Literature on potato diseases in general 221
- Tomato 221
  - Leafspot 221
  - Early blight 223
  - Fusarium wilt 225
  - Yellow blight 227
  - Mosaic 230
  - Bacterial wilt 233
  - Bacterial spot 233
  - Grand Rapids disease 233
  - Leafmold 234
  - Blossom-end rot 234
  - Other diseases 235
  - Miscellaneous references on tomato diseases 237
- Sweet potato 238
- Bean 243
- Lima bean 247
- Onion 248
- Diseases of crucifers 252
  - Cabbage 252
  - Cauliflower 259
  - Kale 260
  - Brussels sprouts 261
  - Chinese cabbage 261
  - Kohlrabi 262
  - Collard 262
  - Rutabaga 262
  - Mustard 262
  - Turnip 262
  - Horseradish 262
  - Radish 263
- Diseases of cucurbits 263
  - Cantaloupe 263
  - Cucumber 266
  - Watermelon 268
  - Squash 270
  - Pumpkin 272
- Celery 272
- Lettuce 276
- Peas 281
- Cotton 285
- Tobacco 290
- Sugar cane 296
- Sugar beet 302
- Miscellaneous vegetables 305
  - Jerusalem artichoke 305
  - Asparagus 305
  - Beet 306
  - Carrot 306
  - Eggplant 307
  - Globe artichoke 308
  - Okra 308
  - Parsley 309
  - Parsnip 309
  - Peanut 309
  - Pepper 309
  - Rhubarb 310
  - Salsify 311
  - Spinach 311
  - New Zealand spinach 312
  - Swiss chard 312

As with the other summaries that have been issued by the Plant Disease Survey, the present one is based on reports of collaborators, on information contained in recent literature, and on information supplied by plant pathologists and other agricultural workers. The map (Fig. 5) indicates the states from which collaborators sent in annual reports on vegetable diseases for 1924. Collaborators in the states not marked sent occasional information during the year, but no annual reports were made.

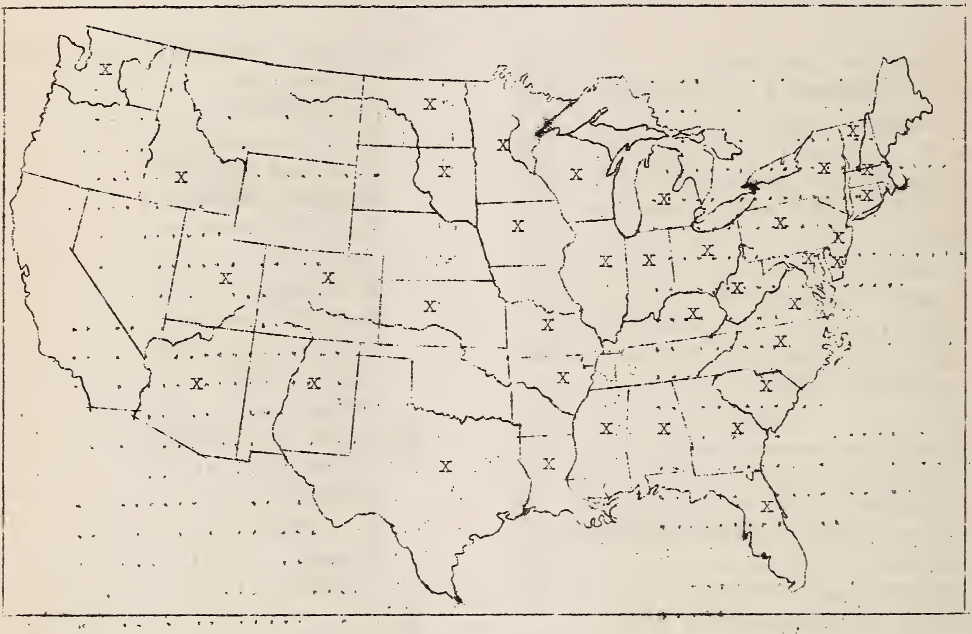

Fig. 5. States from which annual reports on vegetable diseases for 1924 were received.

OUTSTANDING OBSERVATIONS

Among the outstanding diseases of the year the late blight of potato (Phytophthora infestans (Mont.) D By.) should be mentioned. It was more destructive than usual, appearing late in the season in the northern potato states and causing heavy losses in many cases from tuber rot. In Wisconsin, where it was epiphytotic, it was the worst that it has been since 1915. Potato blackleg (Bacillus phytophthorus Appel) was more important than usual in many states, and the newly described potato disease, yellow dwarf, continued to spread and increase in importance in New York. No new occurrences of potato wart (Synchytrium endobioticum (Schilb.) Perc.) were noted outside of the quarantined areas of Pennsylvania, Maryland, and West Virginia. Owing to temperature and other climatic conditions, mosaic of potato was more conspicuous than usual, the symptoms being intensified rather than masked.

It is a satisfaction to learn that certain diseases, particularly mosaic, leafroll, and other degeneration diseases, as well as potato scab, are being reduced in several states owing to the use of better seed, and the application of seed treatment and other control measures.

Of the tomato diseases, yellow blight, of undetermined cause, which occurs in the western states, was unusually severe owing to peculiar climatic conditions which favored it. It was even found occurring for the first time in western Kansas.

The bacterial blight of beans (Bacterium phaseoli EFS.) was very destructive in New York and Michigan. The downy mildew of onion (Peronospora schleideni Ung.) was the worst that it has been for several years in New York.

Bacterial wilt of cucumber and cantaloupe (Bacillus tracheiphilus EFS.) was one of the most important diseases of these crops during the year. The mosaic of cucurbits was also of major importance and a limiting factor to the growth of cucumbers and melons in certain sections. On the other hand less of the downy mildew of cucurbits occurred during the year.

The primary cause of rootrot of peas that is often destructive, particularly in the older pea growing sections, has been determined as the fungus Aphanomyces euteiches Drechs. The range of the bacterial blight of peas (Bacterium pisi (Sackett) EFS.) has been extended greatly through the examination of specimens from various states.

An unusual feature of the cotton disease situation was the occurrence of the Ascochyta blight (Ascochyta gossypii Syd.) in severe form in Virginia, North Carolina, and South Carolina. Soil treatment with an organic mercury compound has been used successfully in Arkansas in the control of damping off of cotton seedlings.

Progress in the control of cabbage diseases by means of seed and soil treatment, and of celery diseases through spraying and dusting in seed beds and field is reported.

The blackfire of tobacco (Bacterium angulatum Fromme & Murray) was one of the outstanding tobacco leafspots of the year, being probably more important than wildfire, which in other years has been important in some states.

Very poor stands of sugar cane occurred in the spring of 1924 owing to the heavy infection of seed pieces by the redrot organism (Colletotrichum falcatum Went.). Mosaic continued to be a serious problem in the growing of sugar cane in the southern states.

MOSAIC DISEASES

A surprisingly large number of field and vegetable crops are affected by mosaic. The only important ones that have not been found attacked as yet are cotton, cabbage, onion, peanut, asparagus, the common beet, rhubarb, and a few, comparatively unimportant, miscellaneous vegetables. On the other hand, there will be found in the pages of this summary records of mosaic, or mosaic-like diseases, some of which are of major importance, on the following crops: potato, tomato, sweet potato, bean, lima bean, Chinese cabbage, rutabaga, horseradish, cucumber, cantaloupe, squash, pumpkin, celery, lettuce, pea, tobacco, sugar cane, sugar beet, carrot, eggplant, pepper, and spinach.

Research on the nature and cause of the mosaic diseases has progressed. Some of the more important contributions of the past year that have been mentioned in this summary are: Johnston's work on the tobacco and potato mosaics and combinations of them; Olitsky's work on propagation of the causal agent in pure culture; and Severin's work on the transmission and rate of spread of the agent causing curly top of sugar beet.

NEW DISEASES

During 1924 several new diseases of field and vegetable crops were reported for the first time in the United States either in literature or in the form of direct reports to the Plant Disease Survey. Some of these reports, however, concern troubles which have not been under observation long enough to be determined definitely and although notes concerning some of these may appear in the following summary, information on others has been withheld for further investigation. The most definite of these new diseases are as follows:

Alternaria solani (Ell. & Mart.) Jones & Grout, although not a new parasite of the potato, was reported this year for the first time as the cause of a tuber rot by Donald Folsom of Maine (Phytopath. 15: 49. 1925).

Bacillus aroideae Town. was reported as the cause of a softrot of green tomato fruit in Virginia by S. A. Wingard (Phytopath. 14: 451-459. 1924).

Phyllosticta sp. was reported as causing a leafspot of tomato in Florida. (See page 235 of this summary)

Aphanomyces euteiches Drechs. has been demonstrated as a major cause of rootrot of pea and has been found in material from New York, New Jersey, Pennsylvania, Delaware, Maryland, Ohio, Indiana, Illinois, Michigan, Wisconsin, Utah, Idaho, Montana, and California.

Mottle necrosis, a new disease of sweet potato, was reported by Harter. (Phytopath. 15: 45. 1925)

Sclerotinia intermedia Ramsey, a new fungus, has been described as the cause of a rot of carrot and salsify. (Phytopath. 14: 323-327. 1924)

Sclerotinia sp. causing a crownrot of onions was reported by E. H. Smith of California. (Phytopath. 14: 125. 1924)

Brittle (undet.) of onion was reported from New York. (See page 251 of this summary)

Bacterial stem girdle (undet.) of lettuce was reported from New York. (See page 280, this summary)

NEW HOSTS FOR PREVIOUSLY DESCRIBED ORGANISMS

Bacterium phaseoli EFS. on Strophostyles helvola. (Gardner, Phytopath. 14: 340. July 1924)

Cercospora althaeina Sacc. on cotton in Illinois.

Mycosphaerella brassicicola (Fr.) Lindau caused ringspot of kale in Washington.

Peronospora trifoliorum D By., the cause of the common downy mildew of alfalfa, was found on pea for the first time in Wisconsin.

Septoria flagellifera Ell. & Ev. Reported on pea in Wisconsin.

Rio Grande disease, hitherto reported only on lettuce has now been reported on carrot in Texas.

Bacterial leafspot of pumpkin undetermined but suspected as being due to Bacterium lachrymans EFS. & Bryan was reported from Indiana and Illinois.

A mosaic-like disease of pea occurred in Maryland and New Jersey.

DISEASES REPORTED FROM NEW STATES IN 1924

Aplanobacter michiganense EFS., on tomato - Connecticut, Ohio.
Ascochyta gossypii Syd., on cotton - North Carolina, *Virginia, *South Carolina.
Ascochyta rhei Ell. & Ev., on rhubarb - *New Jersey.
Bacillus phytophthorus Appel, on potato - Alabama.
Bacterium angulatum Fromme & Murray, on tobacco - Wisconsin.
Bacterium lachrymans EFS. & Bryan, on cucumber - *New York, (western New York: previously reported from Long Island)
Bacterium maculicolum McCulloch, on cabbage and cauliflower - Connecticu
Bacterium pisi (Sackett) EFS., on pea - *Delaware, *New York, *Maryland, *South Carolina, *Florida, *Illinois, *Wisconsin.
Bacterium vitians Brown, on lettuce - *New Mexico.
Cercospora bloxami Berk. & Br., on cabbage - Illinois.
Cercospora concors (Casp.) Sacc., on potato - Iowa.
Cercospora flagelliformis Atk., on spinach - Georgia.
Cercospora sp., on bean - Illinois.
Cercospora sp., on asparagus - California (Phytopath. 14: 125. 1924).
Cercosporella albo-maculans (Ell. & Ev.) Sacc., on turnip - *Georgia.
Colletotrichum atramentarium (Berk. & Br.) Taub., on potato - New York.
Colletotrichum circinans (Berk.) Vogl., on onion - Kansas.
Diplodia tubericola (Ell. & Ev.) Taub. (Java blackrot), on sweet potato - Georgia.
Fusarium malli Taub., on onion - Ohio.
Fusarium conglutinans Woll., on kale and cabbage - California (Phytopath. 14: 125. 1924).
Helminthosporium sacchari Butler, on sugar cane - Mississippi.
Isariopsis griseola Sacc., on bean - Florida (1923).
Peronospora effusa (Grev.) Ces., on spinach - *New Jersey.
Peronospora schleideni Unger, on onion - Georgia.
Phoma destructiva Plow., on tomato - Illinois.
Phytophthora infestans (Mont.) D By., on potato - Illinois.
Pseudoperonospora cubensis (Berk. & Curt.) Rost., on watermelon - California (Phytopath. 14: 125. 1924).
Ramularia areola Atk., on cotton - Florida.
Sclerotium bataticola Taub., on sweet potato - Iowa.
Uromyces betae (Pers.) Lev., on garden beet - *Oregon.
Western yellow blight (undet.), on tomato - Kansas.
Witches' broom (undet.), on potato - Washington (Phytopath. 14: 372-383. 1924).
* = Specimens received.

POTATO

LATE BLIGHT CAUSED BY PHYTOPHTHORA INFESTANS (MONT.) D BY.

During 1924 late blight was much more destructive than usual. In parts of northern New England, New York, Pennsylvania, and Ohio it became prevalent late in the season as a tuber rot and resulted in very heavy losses. In the important potato state of Wisconsin the disease was the most destructive it has been in years. Not since 1915 has such an epiphytotic as that of the past year swept Wisconsin. It did considerable damage also in Minnesota and Michigan, and the first authentic report of the occurrence of the disease in Illinois was received from the northern part of the state. In West Virginia it was not only destructive as a tuber rot but also caused heavy loss by blighting the vines earlier in the season. As usual it occurred in the mountains of North Carolina, and it was present, but not especially destructive in the early potato sections of Hastings, Florida, and Beaufort, South Carolina.

The following reports and table give more details concerning prevalence and distribution, and the accompanying map (Fig. 6) shows the geographic distribution as closely as can be determined from collaborators' reports.

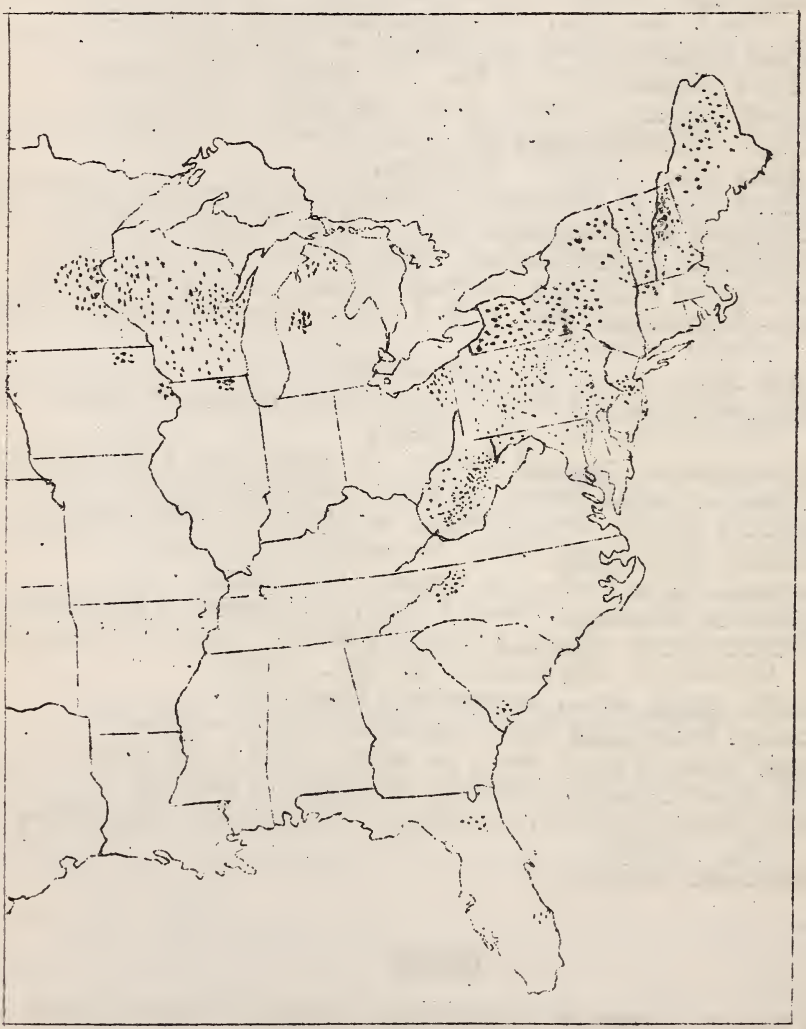

Fig. 6. Geographic distribution of late blight and rot of potato, 1924. Heavy stippling indicates areas where disease was most important.

Table 55. Dates of earliest appearance, estimated loss and relative prevalence of late blight and rot in 1924.

State	First appearance		Estimated state loss	Prevalence compared with	
	Date	Place	%	1923	Average year
Fla.	April 1	Hastings	-		
S. C.	March 6	Beaufort	1	Less	Less
N. C.	July 1	Watauga Co.	3		Same
W. Va.	July 3	Webster Co.	25	More	More
N. J.	July 1	Mercer Co.	2	More	More
N. Y. (L.I.)	July 5	Riverhead, L.I.	trace		
Pa.	July 21	Chester Co.	9	Much more	More
N. Y.	Aug. 19	Monroe Co.	8	Much more	More
Mass.	-	-	trace	Less	Less
Vt.	Sept.	-	15	More	More
N. H.	Sept. 3	Grafton Co.	10	More	More
Me.	Sept.	-	-		
Ohio	-	-	1	More	More
Ill.	Sept. 15	McHenry Co.	trace	More	More
Mich.	Sept. 1	Alpena Co. Montcalm Co.	5	More	More
Wis.	Aug. 11	Barron Co.	16	Much more	More
Minn.	Oct. 20	Pine Co.	1	Much more	More
Iowa	-	-	trace	More	-

Maine: In check plots, with some foliage infection in every hill, no rot was found at digging. These plots yielded 99% as well as the sprayed plots (each series triplicated). The dusted plots yielded about the same. No complaints of rot have come in from growers. (Folsom)

New Hampshire: Destructive especially in northern part of state, Coos and Grafton Counties. (Butler)

Vermont: Distributed over the state and generally resulted in serious tuber loss where spraying was inefficient or lacking. (Gilbert)

Massachusetts: Not seen on vines: A very few tuber lesions noted at harvest time. (Osmun)

Connecticut: Not reported in state this year. (Clinton)

New York: Very important, not much foliage infection but many rotting tubers. 'It was surprising to receive so many reports during November of trouble with tuber rot when there was so little blight on the foliage. (Chupp)

New Jersey: Important in limited areas, blighting foliage but causing only a trace of tuber rot. Occurred in Central Jersey. None found in South Jersey (Gloucester County) on either the early or late crop. (Martin)

Pennsylvania: Foliage blight of average importance but tuber rot very severe in numerous localities. (Orton)

Occurrence in three southeastern counties most unusual. (Thurston)

West Virginia: The bulk of the commercial potato crop in this state is raised in central section and in the Ohio Valley. The Valley section is a comparatively narrow strip, and early potatoes are grown almost exclusively. In ordinary years potatoes in the central section where late blight is common, are planted early enough to mature at least part of the crop before late blight can cause much damage. This past year, however, the crop was planted unusually late, due to so much wet, cold weather in early spring. Much of the crop, therefore, which would ordinarily escape the blight was just about in the stage when the blight will cause the most damage.

I found the blight in advanced stage on July 3 in Webster County. Soon after this I found it prevalent all through the lower central section. Here the crop was greatly reduced. In the northern part of the central section the blight got started somewhat later, but still in time to cause considerable damage. A number of county agents and I estimated the damage fully 50%.

As potatoes in the Ohio Valley were not affected, and the crop in the eastern part of the state was almost a total failure due to very dry weather (east of the mountains), I estimated that the entire crop produced in the state this year was reduced about 25%. This estimate has been strengthened later by samples and reports coming in of considerable damage from tuber rot. Late season observations and reports indicate that the blight appeared in many counties further west than usual, and was in time to cause tuber rot, though not early enough to reduce the yield materially. Throughout the mountainous section of the state the weather was unusually wet all summer, but was followed generally by a fairly dry fall. (Sherwood)

Illinois: Found only in McHenry County. (Tehon)

Michigan: Reported from Antrim, Montcalm, Alpena, and Kent Counties. (Coons)

Wisconsin: Very important on late varieties. Statewide in occurrence, less on sandy soil and in northern tier of counties where vines were killed by early frost. Traces of leaf infection were followed by general tuber infection. (Vaughan)

Minnesota: Serious in northeast section of state. Observed chiefly as tuber rot in bins. First serious outbreak since 1915. (Sect. Pl. Path.)

Iowa: Slightly important, causing rotting of tubers in storage in Mitchell and Dubuque Counties. (Porter)

As already stated the disease became especially noticeable late in the season in the more northern late potato states. In many cases the blight of the leaves was not noticed at all or was confused with frost injury. However, when the potatoes were dug and especially after they were stored for a few weeks the damage from rot became very evident. This late, destructive appearance is directly correlated with a wet August in Wisconsin and adjacent territory, and a wet September in the New England and North Atlantic States.

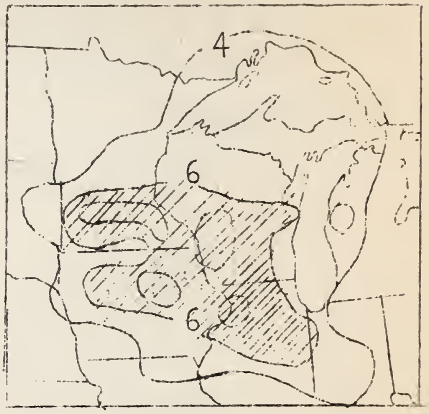

Fig. 7. August rainfall in Wisconsin and adjacent states. (Shaded area = more than six inches)

The average precipitation for August in Wisconsin was 7.29 inches or 4.11 inches above normal. This is the highest August rainfall in the past 34 years or since complete records have been taken in that state. The map (Fig. 7) shows the distribution of this rainfall and it will be seen that in general the regions of highest rainfall are coincident with those of most blight. In Indiana, Illinois, and parts of Iowa, however, August was wet but no blight, or at least only a slight amount of it, occurred. In these cases perhaps temperature is the limiting factor. The disease has never been reported authentically from Indiana, and this year we have the first report from Illinois, in a northern county. In Iowa also the disease is usually not destructive except occasionally in the northeast section. Comparatively high temperatures in these states are probably largely influential in holding blight in check and even when, on rare occasions, favorable weather for late blight does occur, the lack of inoculum prevents development.

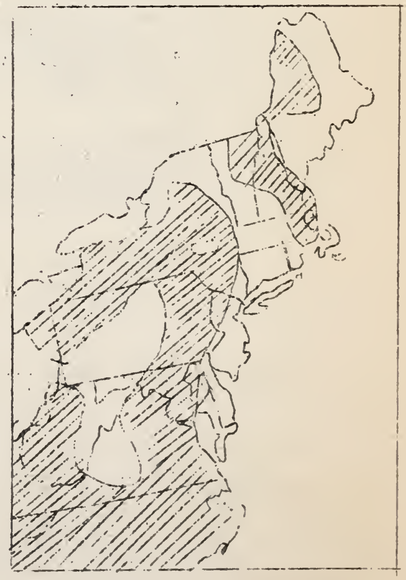

Fig. 8. September rainfall. Shaded area had more than 6 inches rainfall. Practically all remaining area had 4-6 inches.

In New England and the North Atlantic States a correlation with September rainfall is evident. The disease was not noticed in New England until September and in upstate New York until August 19. The areas of heavy rainfall indicated on the map (Fig. 8) correspond more or less to areas of principal damage from late blight and rot.

In central New Jersey and on Long Island the disease appeared on the foliage early in July but it was checked by dry, hot weather and did no more damage.

In West Virginia there was an excess of rain during the summer. The average total rainfall for the state was 5-1/2 inches or over for each of the four months, June, July, August, September, and the average for these four months was 4.94 inches.

Only one collaborator, W. H. Martin of New Jersey, mentions the subject of varietal resistance. He reports the occurrence of only slight infection on several German varieties, whereas Green Mountain, Rose, Rural, and Cobbler in the same plots were affected more severely.

Recent literature

1. Dean, D. Spraying for late blight and rot in 1924. Potato News Bul. 2: 52-56. Feb. 1925.

2. Gram, Ernst. Forsog med bekaempelse af kartoffelskimmel paa kartofler og tomater 1917-1923. (Control of late blight (Phytophthora infestans) of potatoes and tomatoes) Tidsskr. Planteavl. 30: 597-621. 1924.

3. Löhnis, Maria P. On the resistance of the potato tuber against Phytophthora. Rept. Intern. Conf. Phytopath. & Econ. Entom. Holland, 1923: 174-179. 1923.

4. Murphy, P. A., and R. McKay. The development of blight in potatoes subsequent to digging. Journ. Dept. Lands & Agr. Ireland 24: 103-116. Aug. 1924.

5. Sartory, A., and R. Sartory. Action du bichromate de potassium et du bichromate de cuivre sur la croissance du Phytophthora infestans. Compt. Rend. Acad. Sci. Paris. 179: 69-70. July 7, 1924.

6. Zimmerman, H. Phytophthoraknollenfäule dur Pflanzkartoffeln (Anbauversuch). (Phytophthora tuber rot of seed potatoes (cultivation experiment).) Angew. Bot. 6: 51-53. 1924.

7. Zippelius, H. Verbesserte Kupferkalkbrühe. (Improved Bordeaux mixture.) Deutsche Obst- und Gemüsebauzeit. 70: 37-38. 1924.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT

In occurrence, the early blight was widespread as usual. However, for the most part it was not especially serious, except in restricted areas of certain states. States reporting more early blight in 1924 were New Hampshire, New York, New Jersey, Delaware, South Carolina, Minnesota, and Iowa. In New Hampshire, Butler reported it as especially destructive in the southern part of the state during late August and September. In one field he estimated 20% reduction in yield on account of the foliage being destroyed. On Long Island, New York, it was serious in some fields, especially where plants were growing under unfavorable conditions. In New Jersey where 3% loss was estimated, it was most severe in the southern part of the state, being more abundant than for the past several years. In Delaware heavy infection of the early crop occurred but the late crop was only slightly infected, according to J. F. Adams. In South Carolina, the state which reports more loss than any other, early blight was said to be very important generally over the state, and most severe on sandy land, due, probably to a weakened condition of the plants. In Minnesota and Iowa, although there was more than usual, the loss was only a trace.

In the Gulf States and Georgia the disease was mentioned as occurring especially in the southern potato sections.

Table 56. Estimated percentage loss from early blight of potato, according to collaborators, 1924.

Percentage loss	States reporting
15.	South Carolina
5	Kentucky
3	New Jersey
2	North Carolina
1.5	Illinois
1	New Hampshire, Vermont, Delaware, Alabama, Mississippi, Texas, Arkansas, Arizona.
0.5	Connecticut, Pennsylvania, Maryland, Ohio, Tennessee,
0.3	New York.
Trace	West Virginia, Georgia, Louisiana, Michigan, Wisconsin, Minnesota, Iowa, North Dakota, South Dakota, Kansas, Utah, Idaho, Washington.
0 or no data	Other states.

Regarding susceptibility of varieties, the collaborator from Wisconsin reported that Triumph, Irish Cobbler, and Green Mountain seem to be more susceptible than other varieties. In Maryland, late Irish Cobblers were most severely affected.

Plots sprayed with Bordeaux mixture in New Jersey showed good control. On July 14, in demonstration plots, 46% of the leaves of unsprayed plants were killed as compared with 5% of the leaves of sprayed plants. Yield of the former was at the rate of 189.4 bushels per acre, and of the latter 239.8 bushels.

The observation of R. E. Vaughan of Wisconsin, that most disease occurs where there was no rotation is of interest and probable significance in connection with the control of the disease.

Hitherto Alternaria solani has been regarded as a fungus attackkng the foliage only of the potato plant. However, at the Washington meeting of the American Phytopathological Society, Folsom and Bonde (1) reported the fungus as the cause of a tuber rot. It was isolated from lesions in tubers taken from commercial storage in different years and places, and successfully inoculated into and reisolated from leaves and tubers. These workers think that under Maine conditions the chief loss involved from this type of rot is due to secondary infection through the early blight lesions.

Literature cited

1. Folsom, Donald, and Reiner Bonde. Alternaria solani as a cause of tuber rot in potatoes. (Abstract) Phytopath. 15: 49. Jan. 1925.

SCAB CAUSED BY ACTINOMYCES SCABIES (THAX.) GUESSOW

Scab was widespread over the United States, as usual, during 1924. However, according to collaborators, in the southern states from South Carolina to Louisiana and Arkansas the disease was of very minor importance and in some states extremely rare. Collaborators in Florida report that scab is not considered of much importance in the important Hastings potato section. It would be of interest to determine the reasons for this comparative scarcity of scab in the South.

For the most part the disease was of average prevalence in the various states, however, in New York it was reported as being worse than last year and the average and was very important, causing a reduction in yield estimated at 5%. In one field of twenty acres, which yielded over 300 bushels per acre, only forty bushels of salable potatoes per acre were harvested. Kentucky and Tennessee reported an excess of scab on the second crop. In all sections of Tennessee it was especially bad. Indiana and Kansas were the other states indicating more than average severity. In the latter state where it was particularly serious in the western end of the Kaw Valley potato section, the situation was particularly interesting, scab being the worst that it has been in years. An average of 4% was thrown out on account of scab in order to make U. S. Grade No. 1, and the state loss from scab was estimated at 3%. Older fields showed more infection than new fields, and in some, every potato was infected. This unusual prevalence was correlated with weather conditions as will be shown later.

Table 57. Percentage losses from scab, as estimated by collaborators, 1924.

Percentage loss	States reporting
5	New York, Iowa, Michigan
3	North Carolina, Kansas, New Mexico
2	New Jersey, Pennsylvania, Arizona
1.5	Maryland
1	Illinois, North Dakota, Alabama, Texas
Trace	West Virginia, Wisconsin, South Dakota
No data	Other states

Weather relations

Considerable work has been done during the last few years on the influence of temperature, moisture, and other environmental factors on the development of scab. Jones, McKinney, and Fellows (3) concluded that 22° -25°C. may be accepted as about the optimum soil temperature for scab under the conditions of their experiments; and Sanford (9), of Minnesota, found that the most scab develops in soils that are comparatively dry. In moist or wet soils scab is inhibited.

It is difficult to explain the occurrence of and variations in the amount of scab on the basis of temperature and soil moisture relations. It is not unlikely that the scarcity of scab in some of our extreme southern states is influenced by one or both of these factors. Concerning the relation of soil moisture to scab development in 1924, the collaborator from New Jersey reports less scab this year on account of a wet season, and the collaborators in Kansas report more scab than usual, particularly in Shawnee County, on account of dry weather. On the other hand, collaborators from New York and Indiana report more scab than usual and attribute it to wet weather during the early stages of tuber formation. These reports are as follows:

New Jersey: Scab counts made on ten plots for 1923 showed 46% of the crop unsalable. On these same plots this year, only 5% of the crop was unsalable. This difference is probably due to the fact that the season of 1923 was dry while the past season was very wet. (W. H. Martin)

Kansas: The most outstanding feature in regard to this report is the increase in the amount of scab. I was in several fields this season where you could not find a potato without a deep scab pit. Such fields were not uncommon in Shawnee County at the western end of our main potato growing section. This epidemic of scab is correlated with precipitation. The months of March, April, and May were far below normal in the whole valley. June had normal or above normal precipitation throughout the valley except Shawnee County, which remained 2.84 inches below. In Shawnee County the scab epidemic was most severe. (R. P. White, Nov. 12)

New York - Long Island: Scab was unusually severe in many fields. This apparently was associated with wet weather during the early stages of tuber formation. (Clayton, Oct. 30)

Indiana: Scab serious. Wet June favored it. (Gardner)

Wisconsin: Freedom from scab seems to be associated with the lower temperature and more moisture, rather than any greater amount of seed treatment. (Vaughan)

Varietal susceptibility:

New York: The following results were obtained from the potato inspections:

No. of fields	Variety	Acres	% scab
40	Irish Cobbler	190	6.08
166	Green Mountain	733	12.5
33	Russet Rural	156	1.8
47	Smooth Rural	287	5.3

(Chupp)

New Jersey: In a variety test the number of clean tubers in each variety was as follows:

Variety	Percent clean tubers
Irish Cobbler	40.8
Green Mountain	28.4

Variety	Percent clean tubers
American Giant	60.0
Burbank	37.0
No. 9	56.0
Rural Russet	69.0

Pennsylvania: Green Mountain most susceptible, Cobbler very susceptible, White Rurals moderately resistant, Russet Rurals quite resistant. (C. R. Orton)

In the valleys formerly constituting the "safety zone" about the area infested with potato wart, scab was much less prevalent than in 1922 and 1923. This seems largely due to the return to Russet Rurals as the principal late potato. Where Green Mountains were planted, scab was severe, in spite of temperature and moisture conditions, generally regarded as unfavorable to scab; thus the mean temperature (May to Sept.) was 57.6°F. in 1924, as against 61.7° in 1923, and 64.2° in 1922; the precipitation in 1924 (May to Sept.) was 30 inches, compared to 22.69 inches in 1923 and 22.77 in 1922. Every month during the 1924 season was cold and wet as compared to normal. In adjacent rows, from local seed, Green Mountain gave no clean tubers, 50% salable and 50% unsalable, and Russets gave 73% clean, 27% salable and no unsalable on account of scab. The Green Mountains in this instance yielded 151 bushels per acre; the Russets 87 bushels. The application of 300 to 600 pounds of inoculated sulfur increased the proportion of clean Green Mountains to 20%, and salable to 80%. (Freeman Weiss)

Michigan: Russet Rural reported markedly resistant. (Coons)

Kansas: Irish Cobbler very susceptible, Early Ohio less so. (White)

Idaho: Idaho Rural and other white and red potatoes much more susceptible than Netted Gem. (Hunderford)

Control:

Since so many of our plant diseases are not decreasing as fast as one would expect when the efforts at control are considered; it is satisfactory to learn that in Vermont and probably in Wisconsin, scab is on the decrease due to the more extensive use of seed and soil treatments. It is not unlikely that the same could be said of certain other states in which considerable extension work in seed and soil treatments has been done.

New York:- Long Island: Many farmers are using inoculated sulfur and securing good control. (Clayton, Oct. 30)

New Jersey: In a comparison of nitrate of soda and sulfate of ammonia 13.4% of tubers were clean on former as compared with 33% in latter. In a test where sulfur was broadcasted at the rate of 350 pounds per acre there was an increase of 40% in the number of clean tubers of the Irish Cobbler variety, 32% for Green Mountains and 34% for American Giants.

Disinfection of seed potatoes with cold corrosive sublimate gave good results. In Middlesex County the average yield increase on 8 farms was 17.6 bushels and the average increase in clean tubers 11.7%. In Monmouth County similar tests conducted on farms gave an average yeild increase of 10.2 bushels and an increase of 13% in the number of tubers free from scab. (Martin)

Kentucky: Very marked results from treating with mercuric bichloride; partial control apparently obtained by sulfuring seed at cutting time. (Valleau)

Wisconsin: More general treatment is giving cleaner seed stock. Results of treatment were less conspicuous than usual in the central section of the state. (Vaughan)

Iowa: Treatment reduced infection from 30 to 5%. (D. E. Porter)

North Dakota: Crop rotation not effective. Experiments to date conducted on heavy clay loam of Fargo do not indicate profitable application of sulfur to soil. (Weniger)

Idaho: Experiments with inoculated and uninoculated sulfur for the control of scab of potatoes showed in two cases that inoculated sulfur applied at the rate of 300 and 600 pounds per acre gave fairly good control. (Idaho Exp. Sta. Bul. 133: 13. 1924)

Literature:

1. Gardner, J. S. Some observations on the use of sulfur to correct scab in potato land in Kentucky. Proc. Potato Assoc. Amer. 10: 158-161. 1924.

2. Graham, J. C. Some experiments with sulphur as a control for potato scab. Proc. Potato Assoc. Amer. 10: 161-165. 1924.

3. Jones, L. R., H. H. McKinney, and H. Fellows. The influence of soil temperature on potato scab. Wisconsin Agr. Exp. Sta. Res. Bul. 53: 1-35. 1922.

4. Martin, Wm. H. Experiments with sulfur for the control of potato scab, summary of 1921 results. Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921-22): 582-595. 1924.

5. ———————— The influence of nitrogen on the prevalence of potato scab. Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921-1922): 596-599. 1924.

6. ———————— Potato scab control investigations. Proc. Potato Assoc. Amer. 10: 127-139. 1924.

7. Raeder, J. M. Experiments with inoculated sulfur for the control of potato scab in Idaho. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 137-141. Dec. 1924.

8. Rosa, J. T. Effect of sulfur and acid fertilizers on scab in California. Proc. Potato Assoc. Amer. 10: 157-158. 1924.

9. Sanford, G. B. The relation of soil moisture to the development of common scab of potato. Phytopath. 13: 231-236. May 1923.

10. Schreiner, Oswald, and B. E. Brown. Soil treatment for potato scab-control. Proc. Potato Assoc. Amer. 10: 139-156. 1924.

BLACKLEG CAUSED BY BACILLUS PHYTOPHTHORUS APPEL

According to collaborators' reports, blackleg was more important than usual in New York, New Jersey, Pennsylvania, Maryland, Ohio, Michigan, Wisconsin, Minnesota, and Iowa. In New England, and the southern and western states, the disease was of about normal, or perhaps subnormal prevalence. In the South, from South Carolina to Arkansas and Texas, the disease appeared to be absent or at least very rare, in which respect the situation is the same as in other years.

Table 58. Estimated losses from and maximum percentage of blackleg observed, according to collaborators, 1924.

Average percentage reduction in yield	State	Maximum percentage observed	State
2	Michigan, Minnesota, North Dakota	50	Illinois
		30	Minnesota, Kansas
1	Maryland, West Virginia, North Carolina, Ohio, Iowa, South Dakota, Kansas	25	Maryland
		12	Iowa, Pennsylvania
0.5	Connecticut, Idaho	11	New Jersey
0.2	New York	10	Vermont, Wisconsin, South Dakota
Trace	New Hampshire, Vermont, Massachusetts, New Jersey, Indiana, Illinois, Wisconsin, Alabama, Washington	7	Michigan
		5	New York
		4.25	New Hampshire
0	Georgia, Kentucky, Tennessee, Mississippi, Louisiana, Texas	1	West Virginia
No data	Other states		

Some of the collaborators' statements concerning the distribution of the disease within the states are of interest. In New Hampshire it is not usually seen outside of the northernmost county, Coos County. In New York it was widespread, probably occurring slightly in every county. In New Jersey it is chiefly in central and southern Jersey. In West Virginia the Ohio Valley section and Tucker and Randolph Counties are chiefly affected. In North Carolina the reports came from the Coastal Plains region. In Ohio the disease was general, and in Illinois it was especially prevalent in the southwestern section. In Wisconsin the disease was scattered throughout the potato belt, and it was abundant in the Red River Valley of Minnesota and North Dakota. In Iowa it was common throughout the state, and in Kansas it was most serious in the Kaw Valley, particularly in Jefferson and Shawnee Counties.

Collaborators in Connecticut, New Jersey, Maryland, and Ohio remarked that as usual the disease was most serious in seed shipped in from the outside, and that in some cases even certified seed showed considerable blackleg. In Connecticut and New Jersey some complaints were received concerning Maine seed, and in Maryland seed from Prince Edward Island showed heavy percentages of blackleg. On the other hand, in New York, where the disease was more prevalent than usual, the collaborators' report that this is the first season it has been noticed to any extent on plants grown from homegrown seed. In previous years most of the blackleg was in fields from Maine seed. Collaborators in Michigan and a few of the other states mention the fact that certain seed-stocks become contaminated and can be detected in various localities where grown. In Michigan also the disease is said to be spreading.

Literature:

Couey, Worth Graham. Dissemination of blackleg by cutting and planting machines, North Dakota. U. S. Dept. Agr. Office Coop. Ext. Work, Extension Pathologist (mimeogr.) 2: 142-143. Dec. 1924.

STEMROT AND SCURF CAUSED BY CORTICIUM VAGUM BERK. & CURT.

The Rhizoctonia disease occurred widely over the country as usual. However, reports indicate that it was not at all common in the southern portion of the country, that is, from Tennessee and southern Missouri south. It was said to be the most important parasitic disease of the year in the states of Michigan, Minnesota, North Dakota, Iowa, Missouri, and Kansas, and was second in importance to late blight in Wisconsin. A greater amount than usual was reported from Vermont, where it proved to be a limiting factor in seed certification. In Massachusetts it was said to be responsible for about one-fourth of the missing hills occurring in potato fields, and in New York, where it is always an important disease, it was about as prevalent as last year, causing an estimated reduction in yield of 5%. In Kentucky it is usually common in the spring crop, but this year it appeared to some extent in the second crop for the first time, and is associated by collaborators in that state with cool weather during the latter part of the season. In the Red River Valley of Minnesota and the Kaw Valley of Kansas, the disease was ctive, and the following reports concerning it in these sections are interest.

Minnesota: The disease is present in 100% of the fields in the Red River Valley, varying from a trace to practically 100% of the plants infected. Many young plants are completely girdled and killed, others are badly stunted. Undoubtedly this is the most destructive disease of potatoes this year. The estimated reduction in yield for the entire valley is about 5%. (Sect. Pl. Path., Aug. 1)

Kansas: In the eastern part of the state where rainfall has been plentiful there is considerable damage from Rhizoctonia. Yield records there show treated seed yielding from 25 to 50 bushels more per acre than untreated seed. In the western counties in the Kaw Valley, dry weather affected the crop and Rhizoctonia was not as severe. Yield records show from 0 to 25 bushels more on treated plots. (Stokdyk)

Table 59. Estimated percentage losses from Rhizoctonia disease of potato as reported by collaborators, 1924.

Percentage loss	States reporting
10	Kansas
8	Michigan, Iowa
6	Arizona
5	New York, Kentucky
4	North Carolina, North Dakota
3	Minnesota, South Dakota, Pennsylvania, Maryland
2	Vermont, Utah, Idaho, Washington
1	New Jersey, Ohio, Louisiana
Trace	Connecticut, West Virginia, Georgia, Illinois, Alabama, Mississippi, Texas, New Hampshire, Florida
0 and no data	Other states

Collaborators in New York have furnished data giving the results of potato inspections with regard to Rhizoctonia. The figures show that an average of about 1.5% of the tubers inspected bore sclerotia.

Table 60. Percentage of potatoes with Rhizoctonia sclerotia as shown by inspections in New York, 1924.

Number of fields	Variety	Acres	Percentage of Rhizoctonia
40	Irish Cobbler	190	2.6
47	Smooth Rural	287	1.0
33	Russet Rural	174	0.5
166	Green Mountain	733	1.7

As indicated in the report from Kansas given above, the disease was undoubtedly influenced by weather conditions, particularly low temperatures. The states of Michigan, Wisconsin, Minnesota, Iowa, Missouri, and the Dakotas, in all of which Rhizoctonia was destructive, all experienced subnormal temperatures from May to September. A number of collaborators make mention of the probable influence of low temperatures in their annual reports.

The following statements concerning control have been furnished:

New York: In Genesee County, 10,000 bushels were treated by the hot corrosive sublimate method. (Chupp)

New Jersey: Good control followed seed treatment. Results of numbers of tests in central Jersey showed increase in yield following use of mercuric chloride. (Martin)

Michigan: Seed treatment not general. (Div. Botany)

Wisconsin: Corrosive sublimate treatment highly satisfactory, and is commended by all seed growers. (Vaughan)

Missouri: Sixty to seventy-five percent control by the use of hot formaldehyde. (E. M. Page)

North Dakota: Best results from combination of crop rotation, seed selection, and treatment. (Weniger)

Kansas: The hot formaldehyde treatment on the whole is looking better and has given better control of Rhizoctonia than a ninety-minute treatment with corrosive sublimate. There was a large acreage planted this year with seed treated with hot formaldehyde, and the indications are that this method will replace the corrosive sublimate. One community is, at present time, erecting a community grading shed and treating outfit, located on track. Our fall treatments are showing up well and we expect to have as large increases in yield from fall treated seed as from spring treated. (R. P. White)

An important piece of work on Rhizoctonia control and potato seed treatment in general is that of G. H. Cunningham (2) of Australia. He noted that solutions of corrosive sublimate of the strengths ordinarily used (1-2000) were absolutely ineffective in killing Rhizoctonia sclerotia and that solutions as strong as 1-500 failed to give complete control. However, when he added hydrochloric acid in as small amounts as 0.1%, complete killing was obtained, even at a strength of 1-3000; and with 0.25% H Cl, corrosive sublimate 1-4000 was effective.

Literature:

1. Briton-Jones, H. R. Strains of Rhizoctonia solani Kühn (Corticium vagum Berk. & Curt.). Trans. Brit. Mycol. Soc. 9: 200-210. Aug. 1924.

2. Cunningham, G. H. Corticium-disease of potatoes. New Zealand Journ. Agr. 30: 14-21. Jan. 1925.

3. Howitt, J. E. Results of experiments to prevent potato Rhizoctonia. (Abstract) Phytopath. 14: 349. 1924.

4. Müller, K. O. Untersuchungen zur Entwicklungsgeschichte und Biologie von Hypochnus solani P. u. D. (Rhizoctonia solani K.) Arb. Biol. Reichsanst. Land. u. Forstw. 13: 197-262. Nov. 1924.

5. Noble, R. J. Rhizoctonia scab in potatoes. Agr. Gaz. New South Wales 35: 631-632. Sept. 1924.

6. Page, E. M. Hot formaldehyde in Missouri. U. S. Dept. Agr., Office Coop. Ext. Work, Extension Pathologist (mimeogr.) 2: 106-107. Oct. 1924.

7. Schander, R. and K. Richter. Die Rhizoctonia-Keimfäule der Kartoffel und die Möglichkeit ihrer Bekampfung durch Beizung. Angew. Bot. 6: 408-427. 1924.

WILT CAUSED BY FUSARIUM OXYSPORUM SCHLECHT.

This disease was apparently relatively unimportant during 1924, except in Colorado, Utah, and some of the western states where it is oftentimes destructive. In the states of Pennsylvania (eastern and southeastern portions), Michigan, Iowa, and Kentucky also it was of some importance, but was secondary when compared with some of the other diseases of those states.

Table 61. Percentage reduction in yield due to Fusarium wilt of potato as estimated by collaborators, 1924.

Percentage loss	States reporting
4	Pennsylvania, Utah
2	Michigan, Iowa, Kentucky, Arizona
1.5	North Dakota, Idaho
1	New York, Alabama, Texas, South Dakota
0.5	Georgia, Mississippi, Ohio
Trace	New Jersey, West Virginia, Florida, Kansas, Minnesota
0	Wisconsin, Louisiana.
No data	Other states

It is not unlikely that the cool summer was influential in suppressing Fusarium wilt in some of the late potato states where it is destructive some years.

Recently Goss (1), of Nebraska, has reported that the Fusarium causing by far the most damage to potatoes in Nebraska is Fusarium eumartii Carpenter. Prior to the work of Goss, the damage from this fungus in Nebraska was attributed to F. oxysporum. It is not unlikely that some of the Fusarium troubles of other states may be due to F. eumartii. Investigation should be made to obtain more light on this subject.

Literature cited:

1. Goss, R. W. Potato wilt and stem-end rot caused by Fusarium eumartii. Nebraska Agr. Exp. Sta. Res. Bul. 27: 1-83. June 1924.

WILT AND STEM-END ROT CAUSED BY FUSARIUM EUMARTII CARPENTER

This was reported only from New York, Pennsylvania, and Nebraska in 1924. In the last named state it made its first appearance July 7 on plants grown from infected seed. According to Goss, the wilting symptoms were very pronounced this year as a result of dry weather, and in general the disease was more prevalent than last year, percentages varying from a trace to 20%.

In Pennsylvania, according to C. R. Orton, the disease is increasing annually and probably caused an estimated loss for the state of about 3%. The loss was chiefly in storage but in some cases such severe field infection occurred that many tubers were left on the ground. The Rural group appeared most susceptible.

Literature:

See reference under F. oxysporum above.

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

Maryland, South Carolina, and Florida are the only states reporting this disease in 1924. In Maryland it was noted causing a trace of loss in the southeastern part of the state. In South Carolina it was common and quite important, being first noticed April 21 in the Charleston section. From Florida, L. O. Gratz reports it as one of the more important potato diseases in the Hastings district. The loss in 1924 was estimated at from 1 to 2%. One field was observed where at least 60% of the plants were diseased in four acres at one end of the field.

WART CAUSED BY SYNCHYTRIUM ENDOBIOTICUM (SCHILB.) PERC.

The only new occurrence of wart reported to the Survey during 1924 was one new infested garden found one mile south of Frostburg, Maryland. This is already within the territory known to be infested with the wart organism. The immune variety Irish Cobbler is being used in all infested gardens in Maryland.

From Pennsylvania, C. R. Orton, reported that the disease was of no economic importance except from the quarantine standpoint. The distribution as the same as last year, the disease occurring only on occasional plants where seed mixtures took place.

Literature:

Garbowski, L. Means adopted in Poland for protection against contagion by black scab of potatoes (Synchytrium endobioticum). Intern. Rev. Sci. and Pract. of Agr. n. s. 2: 733-736. 1924.

Hartman, R. E. & W. A. McCubbin. Potato wart. Pennsylvania Dept. Agr. Bul. 394: Oct. 1924.

Köhler, E. Phylyctochytrium synchytrii n. spec., ein die dauersporangien von Synchytrium endobioticum (Schilb.) Perc. tötender parasit. Arb. Biol. Reichsanst. Land. u. Forstw. 13: 382-384. Nov. 1924.

———————— Beiträge zur keimungsphysiologie der dauersporangien des kartoffelkrebserregers. Biol. Reichsanst. Land. u. Forstw. 13: 369-381. Nov. 1924.

Wehnert, H. Die Verbreitung des Kartoffelkrebses in Schleswig-Holstein 1923. (The spread of wart disease of potatoes in Schleswig-Holstein in 1923.) Bideermann's Zentralbl. 53: 339-341. 1924.

Weiss, Freeman. The present status of investigation of potato wart and a consideration of its economic importance. Proc. Potato Assoc. Amer. 10: 31-38. 1924.

———————— The group reaction of potato varieties to wart disease. Potato News Bul. 1 (5): 18-19. March 1924.

———————— and C. R. Orton. Further results in the inheritance of immunity to potato wart. (Abstract). Phytopath. 14: 59. Jan. 1924.

———————— Deux ans d'essais de culture de quelques variétés Francaises de Pomme de terre en terrain contaminé par le Synchytrium endobioticum a Freeland (Pennsylvania). (Two years' trial of cultivating some Frech varieties of Potato in soil infected with Synchytrium endobioticum at Freeland (Pennsylvania).) -- Rev. Path. Vég. et Ent. Agri. 11: 93-98. 1924.

MOSAIC (CAUSE UNDETERMINED)

A considerable number of states mention the fact that mosaic was pecially evident this year, not necessarily on account of an increase in e amount of the disease, however, but rather because of cooler temperatures ich made the symptoms more pronounced. From North Dakota this was reported to be the first year that the symptoms have not been masked. It is satisfactory to note that in Vermont, New York, Louisiana, and apparently some other states the amount of mosaic seems to be decreasing, due to the use of better or certified seed. Table 62 gives the estimated percentages of loss for 1924.

Table 62. Estimated reduction in yield of potatoes due to mosaic as reported by collaborators, 1924.

Percentage loss	States reporting
15	Arkansas
10	New Hampshire, Kentucky, Tennessee, Mississippi, Louisiana, Utah, Idaho, Washington
5	Vermont, Maryland, North Carolina, Georgia, Florida, Alabama
4	New York
3	New Jersey, Ohio, South Dakota
2	Pennsylvania, Michigan, Minnesota, Iowa, Kansas, New Mexico
1	West Virginia, North Dakota
0.5	Delaware
Trace	Connecticut, South Carolina, Illinois, Wisconsin, Texas, Arizona

In New York 354 fields of 1587 acres showed an average of 1.71% mosaic before roguing and 1% after roguing. In New Jersey, in a comparison of certified and non-certified seed, the former showed 7.5% mosaic as compared with 92% for the latter; the yields were 271.4 and 199.1 bushels per acre respectively. In Kentucky only about 3% of the plants in fields from certified seed seemed to be affected. McClintock in Tennessee reported that certified seed of Bliss Triumph from Wisconsin and Nebraska were remarkably free from mosaic and gave good yields. In the Hastings section of Florida mosaic on Spaulding Rose No. 4 was of a mild form, but the percentage of infected plants averaged at least 15, the maximum and minimum limits being 50 and 1%. The few fields of Bliss Triumph planted in the Hastings section were all badly diseased, the percentage ranging from 10 to 100.

The following percentages of infection were observed in the New York state seed plot at Ithaca, N. Y.:

Table 63. Percentages of Mosaic observed on different varieties in seed test plots, Ithaca, New York.

Variety	Number of strains	Percentage mosaic
Bliss Triumph	4	16.5
Burbank	1	10.0
Early Harvest	1	9.0
Early Rose	1	7.0
Spaulding Rose No. 4	7	2.3
Irish Cobbler	24	1.1
Green Mountain	84	2.4
Smooth Rural	55	0.1
Russet Rural	24	0.04

As usual, Bliss Triumph is reported as the most susceptible variety from many states, however, in Maryland, the McCormick is said to be most susceptible.

Concerning varieties, R. E. Vaughan of Wisconsin reported that mosaic was coincident with Triumph, scattered on Green Mountain, and not observed on Irish Cobbler or Rural New Yorker.

Literature:

1. Ducomet, V. Sur la visibilite des symptomes de la mosaique de la pomme de terre. Rept. Intern. Conf. Phytopath. & Econ. Entom. Holland, 1923: 39-42. 1923.

2. Folsom, D., and E. S. Shultz. The importance and natural spread of potato degeneration diseases. Maine Agr. Exp. Sta. Bul. 316: 1-28. 1924.

3. Hungerford, Chas. W. and J. M. Raeder. Mosaic and leaf roll of potatoes in Idaho. (Abstract) Phytopath. 14: 123. 1924.

4. Johnson, James. A virus from potato transmissible to tobacco. (Abstract) Phytopath. 15: 46-47. Jan. 1925.

5. Murphy, P. A., and Robert McKay. Investigations on the leaf-roll and mosaic disease of the potato. Jour. Dept. Agr. & Techn. Instr. Ireland 23: 344-364. Feb. 1924.

6. Smith, K. M. On a curious effect of mosaic disease upon the cells of the potato leaf. Ann. Bot. 38: 385-388. April 1924.

7. Tompkins, C. M. Effect of intermittent temperatures on potato mosaic. (Abstract) Phytopath. 15: 46. Jan. 1925.

LEAFROLL (CAUSE UNDETERMINED)

The following table not only gives the estimated losses from leafroll in various states, but also lists the states from which the disease was reported to the Survey in 1924.

Table 64. Estimated percentage reduction in yield of potatoes due to leafroll as reported by collaborators, 1924.

Percentage loss	States reporting
7	Pennsylvania
5	New Hampshire, Vermont, Connecticut, Ohio, Michigan, Kentucky
2	Maryland, Tennessee, New Mexico, Utah, Idaho, Washington.
1.5	New Jersey
1	North Carolina, Georgia, South Dakota
Trace	Delaware, West Virginia, South Carolina, Florida, Illinois, Wisconsin, Minnesota, Iowa, North Dakota, Nebraska, Kansas, Louisiana
No data	Other states

As in the case of mosaic, some decrease in the amount of leafroll in commercial plantings seems to be evident. The best growers are taking precautions to get good seed. In the field inspections for certified seed in New York in 1924, 1587 acres were inspected, and an average of 2.39% leafroll was found before roguing and 0.6% after roguing. In a comparative test of certified and non-certified seed in New Jersey, the former showed 3% leafroll as compared with 50% in the latter. Thirty lots of certified seed wer employed in this test. In Pennsylvania the loss from leafroll is gradually being reduced by the use of local certified seed and Michigan seed which rarely shows more than 2% leafroll.

Leafroll is the chief cause of degeneration of Rural seed stocks in Indiana, according to M. W. Gardner, and is therefore the main reason for the use of certified seed in that state. The Netted Gem in Idaho is more commonly infected than other varieties, according to Hungerford. The following table, giving percentages of leafroll in various varieties in New York, has been furnished by collaborator Charles Chupp.

Table 65. Percentages of leafroll in New York state seed plots, Ithaca, New York.

Variety	Number of strains	Percentage leafroll
Spaulding Rose No. 4	7	1.7
Irish Cobbler	24	2.2
Green Mountain	84	1.3
Smooth Rural	55	2.9
Russet Rural	24	2.8
Bliss Triumph	4	15.3

Literature:

1. Brehmer, W. von. Der einfluss der kalidungung auf die blattrollkrankheit der kartoffel. Ernahr. Pflanz. 20: 12. Jan. 15, 1924.

2. Gardner, M. W., and J. B. Kendrick. Potato leaf roll in Indiana. Indiana Agr. Exp. Sta. Bul. 284: 1-23. July 1924.

3. Gram, Ernst. Potato leaf-roll influenced by the origin of the tubers. Rep. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 38-39. 1923.

4. Himmelbauer, Wolfgang. Die blattrollkrankheit der kartoffel. Wiener Landw. Zeitg. 74: 43-44. 1924.

5. Murphy, P. A., and R. McKay. Investigations on the leaf-roll and mosaic diseases of the potato. Jour. Dept. Agr. & Techn. Instr. Ireland 23: 344-364. 1924.

6. Whitehead, T. Transmission of leaf-roll of potatoes in N. Wales during 1921. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 147-149. 1923.

7. ——————— Potato leaf-roll and degeneration in yield. Ann. Appl. Biol. 9: 31-41. 1924.

SPINDLE TUBER (CAUSE UNDETERMINED)

This comparatively new and infectious disease was reported this year not only from Maine, Vermont, New York, New Jersey, Ohio, and Nebraska, from which states it was reported in 1923, but what seems to be the same thing was noticed in Florida, Michigan, Wisconsin, and Washington. There was only one authentic record from Michigan, and this was in the progeny from a stock showing spindle tuber in 1923. In Wisconsin it was found on Green Mountain and Triumph.

Concerning the disease in New York, Chupp reports it as occurring in every county in the state, especially important on Irish Cobbler, and probably reducing the yield of potatoes in the state 0.5%. He gives the following figures showing the incidence of spindle tuber in the varietal seed test plot at Ithaca.

Table 66. Percentages of spindle tuber in New York state seed plots, Ithaca, New York.

Variety	Number of strains	Percentage spindle tuber
Early Record	1	4.0
Early Rose	1	23.0
Spaulding Rose No. 4	7	3.0
Irish Cobbler	24	2.8
Green Mountain	84	0.04
Smooth Rural	55	0.05
Russet Rural	24	0.0

In New Jersey, W. H. Martin reports it as present to some extent in almost every field examined, especially in the central and southern parts of the state. In some cases 3% of the plants were affected, and a maximum of 10% was found in one field. A loss of 1.5% is estimated for New Jersey. In Nebraska spindle tuber is more common than mosaic or leafroll, according to R. W. Goss.

OTHER DEGENERATION DISEASES

Witches' broom (undet.) - The states of Idaho and Washington are the only ones reporting witches' broom in 1924. In Idaho it is very important in some fields, being found most commonly in the northern part of the state, but present also in the south. In Washington the disease was observed on Bliss Triumph and Irish Cobbler but was considered of minor importance when compared with mosaic.

Giant hill (undet.) - Reported as occurring in about 95% of the fields in Pennsylvania and causing a reduction in yield estimated at 1 to 2%. It occurred also in Vermont according to A. H. Gilbert (3).

Literature on degeneration diseases:

1. Folsom, Donald. Advance in the study of the virus diseases of Irish potatoes in 1923. Proc. Potato Assoc. Amer. 10: 39-42. 1924.

2. ———————— and E. S. Schultz. The importance and natural spread of potato degeneration diseases. Maine Agr. Exp. Sta. Bul. 316: 1-28. Jan. 1924.

3. Gilbert, A. H. Spindle-tuber and giant hill. Potato News Bul. 1: 291-292. Oct. 1924.

4. Goss, R. W. Effect of environment on potato degeneration diseases. Nebraska Agr. Exp. Sta. Res. Bul. 26: 4-40. 1924.

5. Hungerford, C. W., and B. F. Dana. Witches' broom of potatoes in the Northwest. Phytopath. 14: 372-383. Aug. 1924.

6. Quanjer, H. M. General remarks on potato diseases of the curl type. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 23-28. 1923.

YELLOW DWARF (CAUSE UNDETERMINED)

Yellow dwarf is continuing to spread in New York. It was reported from twenty-four counties in the state and was said to be more prevalent in Steuben County than ever before. As high as 15% affected plants was seen in various fields and a loss of from one-half to one percent is estimated for the state.

TIPBURN AND HOPPERBURN

The following estimates of losses supplied by collaborators indicate less loss from these troubles in 1924 than during some of the other years. Illinois is the only state reporting more damage than usual. From some of the Great Lakes states reports were received that weather conditions were unfavorable for the development of these diseases.

New Jersey collaborators report good control from thorough spraying with Bordeaux mixture.

Table 67. Percentage losses from tipburn and hopperburn of potato as estimated by collaborators, 1924.

Percentage loss	States reporting
15	Minnesota
12	West Virginia
10	Tennessee, New Mexico
5	New York, Ohio, South Dakota
3	Pennsylvania, New Jersey, North Carolina, Texas, Arkansas
2	Georgia, Iowa
1.5	Maryland
1	Illinois
0.5	Connecticut, Delaware, Kansas, Mississippi
Trace	Michigan, Wisconsin, North Dakota, Idaho, Washington
No data	Other states

OTHER NON-PARASITIC DISEASES

Black heart was reported from New York, Wisconsin, and Washington. In New York a loss of 1% was estimated. (Literature: Coons, G. H. The use of black heart potatoes for seed. Michigan Agr. Exp. Sta. Quart. Bul. 6: 182-184. May 1924)

Calico was said to be unimportant in Idaho.

Internal brown spot - reported from Connecticut and Washington.

Literature:

Anon. Internal brown fleck of potatoes. Jour. Dept. Agr. South Africa 8: 266. March 1924.

Paine, S. G. "Internal rust spot" disease of the potato tuber. (Synonyms: Sprain, net necrosis, eisenfleckigkeit, kringerigheid, buntwerden and maladie des taches en couronne). Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 74-78. 1923. Pseudomonas solanicolens n. sp. considered by author as cause of disease.

Streak was reported from New York as rare and found mostly in fields grown from Maine seed.

Sulfur injury caused by too heavy application of sulfur - reported from Suffolk County, New York.

References:

Coons, G. H. The use of black heart potatoes for seed. Quart. Bul. Michigan Agr. Exp. Sta. 6: 182-184. 1924.

Heim, R. La filosité des pommes de terre. Jardinage 12: 172-173. Feb. 1925.

OTHER PARASITIC DISEASES

Bacterium sp., softrot - C. W. Edgerton of Louisiana reports considerable loss from a soft, mushy rot of the tuber caused by bacteria. It is estimated that 2 to 5% of the crop was lost on account of this rot.

Cercospora concors (Casp.) Sacc., leaf mold - Reported for the first time from Iowa.

Colletotrichum atramentarium (Berk. & Br.) Taub., anthracnose - Found attacking plants in the greenhouse in New York.

Fusarium radicicola Woll., jelly-end rot - Idaho collaborators report some trouble from this fungus attacking both the vines and tubers in certain localities. For the state as a whole, however, it was unimportant.

Heterodera radicicola (Greef) Muell., rootknot - Collaborators in Delaware, North Carolina, Texas, New Mexico, and Washington reported nematode injury in 1924. It was only local in occurrence in the first two states; in Texas it was prevalent in light sandy soils; in New Mexico it was very prevalent in the light soils of the Mesilla Valley where it was probably causing a loss of 2% of the crop, according to R. F. Crawford. Collaborators in Washington report much more than in 1923.

Pythium debaryanum Hesse, leak - Reported from Idaho and Washington. It is always important in the midseason crop in Idaho, when not handled properly.

Sclerotium rolfsii Sacc., stemrot - All of the Gulf Coast States from Florida to Texas, and also Georgia reported this disease in 1924. In most of these states it caused only occasional loss, but in Louisiana, where it was more troublesome than usual, the loss was considerable, averaging about 2% for the state, according to Edgerton. It occurred mostly in southern Louisiana and was favored by the climatic conditions of the season.

Spondylocladium atrovirens Harz., silver scurf - Although doubtless widespread, it was only reported from New York, Idaho, and Washington.

Spongospora subterranea (Wallr.) Johnson, powdery scab - One report of this disease was received from Connecticut. It occurred on seed potatoes imported from outside the state.

Literature on other parasitic diseases of potato:

1. Cavadas, D. Sur la biologie de Vermicularia varians Duc. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 181-183. 1923.

2. Dickson, B. T. Saltation in the organism causing "black rot" disease of potato in Canada. Proc. & Trans. Roy. Soc. Canada III, 17 (Sect. V): 123-128. May 1923.
   Undetermined but belongs in the "Colletotrichum-Vermicularia-Volutella" group.

3. Maruda Rajan, D. A new remedy for the potato ring disease. Jour. Madras Agr. Stud. Union 12: 281-284. July 1924.
   Dry heat.

4. Millard, W. A., and Sydney Burr. The causative organism of skin spot of potatoes. Bul. Misc. Inform. 1923: 273-287. Aug. 17, 1923.

   The pathogenicity of Oospora pustulans is proved by inoculation with pure cultures. There is no relation between skin spot and powdery scab (Spongospora subterranea). The previous work of Owen is confirmed.

5. ________________________. The supposed relation of potato skin spot to corky scab. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 78-79. 1923.

Literature on potato diseases in general:

Anon. Potato diseases. Ohio Agr. Exp. Sta. Bul. 374: 1-30. 1924.

Arnaudi, C. Le malattie della patate in Italia. (Potato diseases in Italy.) Atti Ist. Bot. Univ. di Pavia, 3rd Ser. 1: 71-75. 1924.

Coons, G. H., and J. E. Kotila. Michigan potato diseases. Michigan Agr. Exp. Sta. Special Bul. 125: 55 pp. 1923.

Ducomet, V. and E. Foex. Les principales maladies de la pomme de terre 2nd Ed. Paris 1924.

Goss, R. W. Potato diseases. IN Ann. Rept. Nebraska Potato Improvem. Assoc. Ann. Rept. Nebraska State Bd. Agr. 1924: 469-493. 1924.

Tilford, P. E. Diseases of the potato which may be detected in the seed tubers. Month. Bul. Ohio Agr. Exp. Sta. 9: 5-6, 85-87. 1924.

Vaughan, R. E., and J. W. Brann. Control potato diseases. Wisconsin Univ. Agr. Ext. Serv. Circ. 52: 1-24. May 1924.

Werner, H. O. The present and future of seed potato certification. IN Ann. Rept. Nebraska Potato Improvement Assoc. Ann. Rept. Nebraska State Bd. Agr. 1924: 502-511. 1924.

TOMATO

LEAFSPOT CAUSED BY SEPTORIA LYCOPERSICI SPEG.

Leafspot was reported from practically all states east of the 100th meridian and also from New Mexico. For the most part it occurred more or less generally in these states but in certain of them it was much worse in some sections than in others. The following are some of the more localized areas where the infection was severe, - southern New Jersey, southern Delaware, eastern Tennessee, central Indiana, northern Illinois, and southeastern Iowa. According to McClintock the disease does not appear in western Tennessee in time to injure the crop seriously but in the eastern part of the state it was especially bad.

The disease was most important in central eastern United States, or in the area from New Jersey and South Carolina westward to Iowa and Kansas. In the Gulf Coast States with the possible exception of Texas it was of very little importance and for the most part in the western states it was absent.

Table 68. Estimated percentage loss from leafspot, 1924.

Percent reduction in yield	States reporting
35	Delaware
15	Maryland, Virginia, South Carolina, Missouri, Kentucky
10	New Jersey, Mississippi, Wisconsin, Iowa, Tennessee
8	Georgia, Indiana
5	West Virginia, Kansas
4	Alabama, Texas, New Mexico
2	North Carolina
1	Vermont, Illinois, Minnesota
Trace	Massachusetts, Rhode Island, New York, North Dakota, South Dakota, Florida, Mississippi, Arkansas, Idaho

The following states reported that the leafspot was more prevalent than usual: Delaware, Kentucky, Indiana, Illinois, Wisconsin, Iowa, Nebraska, and New Mexico. In the case of Indiana, M. W. Gardner reported that cool weather in the central part of the state retarded ripening and gave Septoria time to destroy the foliage while the fruit was still green. In southern Indiana, however, a good yield was obtained, despite the disease, due to higher temperatures.

Table 69. Dates of earliest appearance, 1924.

Date	Location	Date	Location
June 1	Pavo, Ga.	July 14	Columbus, Miss. and Rock Island, Ill.
June	Beaufort, S. C.		
June 9	Gloucester, N. J.	Aug. 1	State College, N. Mex.
June 16	Tifton Co., Ind.	Aug. 10	Rochester, Wis.
June 20	Manhattan, Kans.	Aug. 15	Ft. Collins, Colo.
July	Jackson, Tenn.		

Practically no data are given on varietal susceptibility or on control, however, during the year spraying and dusting experiments have been reported on by R. F. Poole (1).

Literature:

1. Poole, R. F. Tomato spraying and dusting experiments at Riverton. Ann. Rept. New Jersey Agr. Exp. Sta. 43: 561-565. 1921-22. (1924)

2. Pritchard, Fred J., and W. S. Porte. The relation of temperature and humidity to tomato leafspot (Septoria lycopersici Speg.). Phytopath. 14: 156-169. 1924.

3. ——————————. The control of tomato leaf spot. U. S. Dept. Agr. Bul. 1288: 1-18. Dec. 1924.

EARLY BLIGHT CAUSED BY ALTERNARIA SOLANI (ELL. & MART.) JONES & GROUT

Under this heading are reported three distinct typesof injury, all of which have been attributed to Alternaria solani. However, judging from the differences in symptoms of these troubles, and in the pathogenicity, and in some cases morphology of the fungus, it will probably be found, after careful investigation, that there is more than one organism involved.

Early blight (leafspot and fruit rot)

This disease, which is generally considered as the true early blight, was reported from the states in the eastern part of the country, from New Hampshire to South Carolina and westward to North Dakota and Kansas. Most of the states reported it as not very destructive although in New York 3% reduction in yield occurred and considerable losses to many growers were noted in Wayne County. In Pennsylvania it was severe in Erie County. In West Virginia also, the disease was considered important as a blight of leaves and caused perhaps 5% reduction in yield for the crop as a whole. At the Arlington Farm in Virginia there was much more than usual. One-half percent loss was reported for Delaware and 2%, 4% and 1/2% loss for South Carolina, Illinois, and North Dakota, respectively. In Louisiana, where the growing season was very dry for that state, Edgerton reported that for the first time in years tomato plants lived through the whole summer without being killed by early blight.

Nail-head spot

This fruit spot is decidedly southern in its range and was reported especially from Florida, but also from Alabama and Mississippi. From Florida, G. F. Weber reported:

> "Nail-head (Macrosporium solani Ell. & Mart.) was the most serious and destructive disease of tomatoes in Florida during the past season. It was not as bad as the previous year, however,

The lower East Coast sections were hit hard, harvesting only quarter of a crop. The sections around Bradentown also suffered considerably. The disease was state wide and severe wherever found."

Alabama reports 1% reduction in yield and Mississippi 2%.

Collar rot

Collar rot is a disease of young tomato plants and also of older plants after they have been set out in the field, infected, however, probably originally in the plant bed. Rosenbaum (3) attributed this disease to *Macrosporium solani* Ell. & Mart., and Pritchard & Porte (2) determined that not only could that fungus produce it but also *Verticillium lycopersici* and to some extent *Rhizoctonia solani*. The condition, therefore, as it was reported in 1924 is probably due to the presence of more than one organism. In Delaware, J. F. Adams reported a reduction in yield of 15% for the state, there being much more than during the average year. It was more prevalent in old than in new plant beds. One nursery in Sussex County showed a reduction in yield of 50%. In Maryland it was the worst it has been since 1919 according to Temple and Jehle, and concerning it Jehle writes,

> "Early blight was found to be severely injuring the tomato plants in Dorchester County. Diseased plants were found both in the beds and in the fields. Cankers on the stem and doing the greatest damage, some of them completely girdling the plants and others weakening them so that they are easily broken off by the wind. In some fields as many as 50% of the plants are affected. The disease is not as prevalent in fields which were set out from sprayed beds." (June 27)

According to Temple the diseased plants often recover under favorable conditions, if the soil is ridged up around the stem so that new roots can be produced above the girdle.

Collar rot was also reported as serious in plant beds in Indiana this year by M. W. Gardner and he also mentions having found this as a serious trouble on plant farms in Arkansas and Texas early in June. Collaborators from Arkansas substantiate this report as follows: "Quite common in southwest part of the state on young plants grown for shipping and causing considerable injury." (Dept. Pl. Path.)

Literature:

1. Massee, Ivy. On the presence of hibernating mycelium of Macrosporium solani in tomato seed. Bul. Misc. Inform. Kew 1914: 145-146.

2. Pritchard, F. J. and W. S. Porte. Collar rot of tomato. Jour. Agr. Res. 21: 179-184. May 2, 1921.

3. Rosenbaum, J. Stem disease of tomato caused by Macrosporium solani E. & M., (Abstract) Phytopath. 10: 59. 1920.

FUSARIUM WILT CAUSED BY FUSARIUM LYCOPERSICI SACC.

This important tomato disease was reported to the Survey from a majority of the states south of a line from New Jersey to California, and also from Connecticut, New York, Wisconsin, and North Dakota. As usual, it was most important in the southern states, the loss decreasing from south to north. In Ohio, Indiana, and Illinois it was most prevalent in the southern portions. In Tennessee it caused most damage in the western section although it was present in the central and eastern parts of the state. In Arkansas it was particularly severe in the southern part and in the canning area of the northwestern section, while in Kansas the southeastern quarter was most affected.

Fusarium wilt of tomato is a disease that has been increasing rapidly in range during the past few years. More states are reporting trouble from it than formerly. For instance, in 1924 New York reported it important in some of the fields in the western part of the state and on Long Island, and in Chautauqua County of that state it was estimated that 10% of the plants in a 45 acre field were killed. It is only within the past few years that the disease has been reported from New York. From Florida the report was received that it was more plentiful and more widely scattered than in 1923. Some fields that had shown the disease during the previous season were a total loss in 1924. Miles wrote that the disease was becoming general in Alabama, and Shapovalov reported that in Utah:

> "The contamination of Utah soil should be regarded as very serious and requires immediate measures to prevent further spread as well as intensification of infection in fields already contaminated."

The spread of the disease from state to state and from locality to locality has probably been facilitated greatly by the shipment of contaminated soil or infected seedling plants. In Utah a casual survey of fields set with plants grown at home, in California, and in Georgia, did not establish definitely that the sources of these plants had any influence on the amount of disease, however, a more thorough examination might have given other results.

Table 70. Estimated percentage loss from Fusarium wilt, 1924.

Percent reduction in yield	States reporting
20	Arkansas, Tennessee
15	Louisiana
10	Kansas, Alabama, Mississippi
8	Ohio
6	Georgia
5	Maryland, North Carolina
4	Kentucky
3	Texas, Utah
2	Virginia
1	New York, Indiana, Wisconsin

The maximum percentage of infection in any one field as reported by collaborators may be of interest: New York 10%; Georgia 75%; Alabama 75%; Mississippi 100%; Louisiana 100%; and Utah 87%.

Table 71. Dates of earliest appearance of Fusarium wilt, 1924.

Date	Location
June 1	Richmond County, Ga.
June 13	Hutchinson, Kans.
June 20	A. & M. College, Miss.
July 3	Gloucester County, N. J.
July 12	Clemson College, S. C.
July 14	Harrison County, Ind.
July 17	North Haven, Conn.
July 22	Platteville, Wis.
August	Chautauqua County, N. Y.

Statements concerning varietal susceptibility are as follows:

Tennessee: Wilt resistant varieties such as Professor Essary's Tennessee Beauty produce profitable crops even on infested soils. (McClintock)

North Carolina: Marvel and Norton varieties proved satisfactory in controlling this disease in a dozen or more tests conducted this year. (Fant)

Georgia: Ponderosa more susceptible than Globe or Greater Baltimore. (Boyd)

Alabama: Wilt resistant varieties satisfactory. (Miles)

Mississippi: Resistant varieties gave good results on badly infested soil. (Neal & Wallace)

Louisiana: More general use of resistant varieties is decreasing the loss. (Edgerton)

Arkansas: Resistant tomatoes hold up well in all parts of the state. (Dept. Pl. Path.)

Indiana: Marvel resistant in greenhouses. (Gardner)

Kansas: Norduke, Marvana, Marglobe, Norton, Marvel, and Louisiana red and pink varieties as well as some of our own hybrids and selections showing up well to resistance. (White)

Utah: Norton highly resistant to at least one strain of *Fusarium lycopersici*. This variety is of good canning quality which, if it can be combined with a sufficient degree of earliness will make it a possible substitute for local susceptible varieties. (Richards)

California: Norton becoming more popular wherever Stone is grown. It is being used in cases when rotation is not practicable or possible. (Shapovalov)

Adequate rotation of crops is important in the control of tomato wilt. This statement is borne out by the following reports received in 1924.

Kentucky: The reason for reduction in amount of wilt in canning sections is due to the fact that infested lands have been abandoned. (Valleau)

Texas: Very prevalent on old land where no rotation is practiced. Where tomatoes are grown on new land or land previously devoted to Bermuda pasture, wilt is of little importance. (Taubenhaus)

California: Fields that showed a very high percentage of infection last year are not planted to tomatoes this year. This season only one field was observed where a slight to medium stage of the disease was present on nearly all of the plants in the field. This field was in tomatoes two years ago. Out of ten fields surveyed by the writer in Santa Cruz County none showed a single plant suffering from wilt. Slight to moderate amount of infection may be observed in every tomato growing locality from San Jose and Stockton south including the early sections of Imperial and Coachella Valleys. (Shapovalov)

Recent literature:

Elliott, J. A. Tomato wilt and its control in Arkansas. Arkansas Agr. Exp. Sta. Bul. 194: 1-11. Sept. 1924.

Lesley, J. W. Fusarium wilt of tomato and its control by means of resistant varieties. California Agr. Exp. Sta. Circ. 274: 1-6. Jan. 1924.

Pritchard, F. J. Tomato wilt and varietal resitance. Seed World 17: 7-9. Feb. 1925.

Scott, Irl T. The influence of hydrogen-ion concentration on the growth of Fusarium lycopersici and on tomato wilt. Missouri Agr. Exp. Sta. Res. Bul. 64: 3-32. 1924.

Shapovalov, M., and J. W. Lesley. The behavior of certain varieties of tomato to the wilt disease (Fusarium) in California. (Abstract) Phytopath. 14: 121. 1924.

YELLOW BLIGHT, CAUSE UNDETERMINED

Yellow blight, the important disease of tomatoes in the West, was esecially severe in 1924 in Utah, Idaho, Washington, Oregon, California, and probably other western states. It was reported also for the first time from Kansas by Melchers and Stokdyk, who wrote that it was widely distributed in the western part of the state but was not doing much damage. The following reports from Utah, Idaho, Washington, and California give details concerning the disease in those states.

Utah: Final field observations in the Counties of Boxelder, Weber, Davis, Utah, and Salt Lake, together with estimates of canning company officials indicate that the loss from western yellow blight this year will range between 30 and 35% of the state crop. Fields were commonly observed during the growing season in which 30 and 40% of the plants were diseased. Occasionally fields exhibited a loss of as high as 75% of the plants. Relatively few fields were found where the number of plants diseased remained below 10%.

From the most reliable reports obtained it is evident that the disease this year is by far the most serious since the epidemic of 1905 and far exceeds the average annual distribution of the disease in the state. The destruction is undoubtedly intensified by the exceptional climatic conditions, characterized by low precipitation, low relative humidity and high wind velocity.

A close correlation was found to exist between the severity of the disease and the soil type. The more severe attacks occurred on light sandy or gravelly soil. (Richards)

Idaho: Western yellow tomato blight was especially severe in Idaho this year. Greater losses resulted from this disease than for any year since 1919. Many fields, in those sections of the state where tomatoes are grown for commercial canneries, were practically destroyed. The estimated total loss for the state has been placed at 25%. This estimate is very conservative.

The serious shortage of irrigation water in many sections of the state coupled with the extremely dry, hot weather which prevailed throughout the summer brought about conditions which were ideal for the development of the disease. High soil temperatures with low moisture content of the soil are very conducive to the development of this disease. Shading of the plants and supplying them with an abundance of irrigation water will aid materially in checking the disease under Idaho conditions.

The study of the relation of various cultural practices to the control of western yellow tomato blight and the tests of various varieties and selections of tomato for resistance to the disease have yielded some interesting results this year.

The following table gives the percentage of blighted plants in several promising selections at Lewiston this year in comparison with several strains of Dwarf Champion, a very resistant variety, which were secured from various seed companies. In all, 73 varieties and selections were tested. The range of percentages of all other tests is also given for comparison.

Table 72. Results of tests of various varieties and selections of tomatoes for western yellow tomato blight, Lewiston, Idaho, 1924.

Variety	Percentage infection
Dwarf Champion, Burpee	58
Dwarf Champion, Inland	58
Dwarf Champion, Dreer	58
Dwarf Champion, Thorbur	50
Dwarf Champion, Wedge	38
Dwarf Champion, Livingston	74
Selection 1	44
Selection 2	42
Selection 3	44
Selection 4	44
Selection 5	45
John Baer (Av. of 5 tests)	82
Limits of percentages of all other tests	58 - 100

The selections 1-5 listed above were originally selected in 1919 from the John Baer variety. As will be noted above, the resistance of these selections is twice as great as the commercial stock of John Baer. Many of the diseased plants among the various selections were only slightly blighted and the effect upon the yield was not serious. (Hungerford)

Washington: This disease was very severe in Washington during the past season. I believe that a 50% average would not be too high for the plants affected. I saw many patches that had as many as 75% of the plants dead or dying from this disease. There was a field near the college buildings which I kept under observation throughout the summer and there was an early infection of perhaps 50% in this field with a few plants showing the disease later in the season. (Dana)

California: The most severe outbreak of the season has been observed at Shafter, California. It has developed there to the extent of 99.5% to fully 100%. Further south, at Bakersfield it has been noted in amounts up to 50%. The next section, probably, is Riverside where damage reaches 40 to 50%. In the San Fernando Valley a similar high maximum of western blight has been observed, but only in exceptional cases; mostly the outbreak is mild. Very little of the disease has appeared so far in the Manteca section, usually not exceeding 1%, and in Santa Clara Valley. Only one instance has been noted in Santa

Cruz County where western blight developed to the extent of 10%, and it is usually less than 5% and a number of fields have less than 1%. The disease has shown also in small quantities in the Imperial and the Coachella Valleys toward the end of their growing season (latter part of April). It has been very exceptional in the coastal sections of San Diego, Orange, and Los Angeles Counties. (Shapovalov).

Literature:

1. Shapovalov, Michael. Effect of environmental conditions on western yellow blight of tomatoes. (Abstract) Phytopath. 14: 120-121. 1924.

2. ―――――――――― The significance of the 1924 outbreak of western yellow tomato blight in the United States. (Abstract) Phytopath: 15: 50. Jan. 1925.

MOSAIC, CAUSE UNDETERMINED

Mosaic is another tomato disease that has been increasing during recent years, not only appearing in new states and new localities on both greenhouse and field crops, but also becoming more severe in some of the sections where it was first reported. During 1924 it was reported from 31 states scattered all over the country, whereas in 1918 it was reported from only 15 states; in 1919 from 17 states, and in 1920 from 12 states. Some of the following statements from collaborators will give an idea of the importance of the disease.

New York: Ten percent of the plants in a two acre field in Erie County were dying from mosaic. About 10% loss occurred in one field in Monroe County where infected seedlings were set out. (Chupp)

Pennsylvania: Throughout state, especially severe in Erie County. (Orton)

New Jersey: In many fields on both early and late varieties. In comparison with the past two years, it is equally as serious. (Poole)

Delaware: Very general in distribution, cutting yield. (Adams)

Kentucky: In southwest Kentucky mosaic was of slight severity but at Salt Lick, a new canning section, about 60% mosaic occurred. (Valleau & Gardner)

Florida: More generally distributed and caused more losses than ever before. The east coast sections suffered very little while the west coast regions and the central part of the state were heavy losers. Plant City seems to be hit the worst. There it was an exception to find a plant free from the disease for many miles. The crop was cut 60% by this disease alone in that locality. (Weber)

Louisiana: Severe as usual. Very important, occurring in nearly all of the tomato fields of the state. (Edgerton)

Arkansas: Very common and did considerable damage in the canning sections. (Dept. Pl. Path.)

Ohio: In the trucking section mosaic was the most serious disease. (Young)

Indiana: Serious in greenhouses but not as bad as usual in fields. (Gardner)

Wisconsin: Serious in greenhouses around Milwaukee. More prevalent than usual, at least 25% of the plants seen in southern part of the state showed mosaic. (Vaughan)

Minnesota: Extremely severe throughout the state. Very severe type of disease with bushy brittle plants accompanied by purplish discoloration. (Sect. Pl. Path.)

Iowa: Common over the state. (Porter)

Nebraska: Much more serious than usual and causing considerable loss. It could be correlated with insect infection during wet weather. (Goss)

New Mexico: More important than usual, causing mottling and dwarfing of plants in Mesilla Valley. (Crawford)

Utah: Found this year rather generally distributed in tomato growing districts. Only occasionally, however, were the more extreme forms of the disease encountered, although the general distribution and the high percentage of diseased plants indicates that the loss from this trouble will be considerable. One field was observed in which 54% of the plants showed mosaic. (Richards)

Idaho: Common and important. (Hungerford)

California: Generally distributed but in extremely varying amounts and manifestations. These variations have not yet been connected with any known factor. (Shapovalov)

Very little information has been received during 1924 concerning varietal susceptibility to mosaic. From Connecticut, G. P. Clinton reported that the occurrences noted in that state were on Earliana and Bonny Best, especially the latter; and from New Jersey, R. F. Poole reported the filiform leaf streak, and mottled leaf conditions of the disease were observed in many fields of Stone, Bonny Best, Greater Baltimore, and Acme.

Table 73. Estimated losses from tomato mosaic, 1924.

Percentage reduction in yield	States reporting
15	Louisiana
10	Ohio
6	New York
5	Minnesota
3	New Mexico
2	Iowa
1	Indiana, Illinois
0.5	Maryland
0.2	Utah
Trace	South Carolina, Michigan, Wisconsin

Table 74. Dates of first appearance of tomato mosaic, 1924.

Date	Location
April	Baton Rouge, La.
April 22	Hazlehurst, Miss.
June 9	Gloucester Co., N. J.
June 16	Clemson College, S. C.
June 24	Orange Co., Ind.
June 26	Erie Co., N. Y.
July 20	Madison, Wis.
July 23	Lee Co., Ill.
Aug. 1	State College, N. Mex.
Aug. 13	Wethersfield, Conn.
Aug. 20	Milford, Del.

A piece of work of great significance in the solution of the broad mosaic problem has recently been announced by Peter K. Olitsky (2 and 3) of the Rockefeller Institute for Medical Research. Olitsky has apparently succeeded in propagating and multiplying the causal agent on an artificial medium made up of an aqueous extract from healthy tomato plant tissue. He states that, "The conclusion seems justified that the incitant of mosaic disease of tobacco and tomatoes is a living microvic body which can be cultivated in an artificial medium."

Literature:

1. Poole, R. F. Tomato crop losses may be reduced. Streak and filiform diseases checked by destroying weeds and insects. New Jersey Agr. 6: 5, 8. Jan. 1924.

   He advocates eradication of annual and perennial weeds harboring mosaic and control of plant lice by use of nicotine.

2. Olitsky, P. K. Experiments on the cultivation of the active agent of mosaic disease of tomato and tobacco. Science 60: 593-594. Dec. 1924.

3. ———————— Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exp. Med. 41: 129-136. Jan. 1, 1925.

BACTERIAL WILT CAUSED BY BACTERIUM SOLANACEARUM EFS.

This disease in general was of minor importance in 1924 except in the Gulf Coast, and possibly certain other of the Southern and Southwestern, States. In Florida it was one of the important diseases, being widely distributed with the crop and according to Weber, killing plants in many fields but usually not affecting more than 10% of the plants. In Alabama it was locally severe, causing a loss estimated at 0.5% for the state. From Mississippi reports of slightly more injury than usual were received together with the statement that the disease was important in certain localities. In Louisiana it was of some importance and apparently occurred in greater amounts than usual, reducing the crop yield by 2% or 3%. From Arizona it was reported as prevalent in Navajo, Apache, and Cochise Counties and it was estimated that the crop would be reduced there by about 4%. From the other states reporting the disease, namely, Maryland, South Carolina, Georgia, Texas, and Arkansas, only a trace of injury was recorded.

BACTERIAL SPOT CAUSED BY BACTERIUM VESICATORIUM DOIDGE

Indiana and Michigan are the only states definitely reporting this disease in 1924, although a suspected case was observed in Illinois and it was also thought likely that the disease occurred near Clyde, Kansas, from which place it was originally collected in that state. In Indiana it was more prevalent than usual and during September was very serious in Marion and Hancock Counties. According to Gardner and Kendrick, canners have neglected seed treatment in these counties which accounts somewhat for the increased prevalence. The first observation in Indiana was July 10 in Grant County.

GRAND RAPIDS DISEASE, APLANOBACTER MICHIGANENSE EFS.

The Grand Rapids disease, first reported from Michigan in 1909, is now known definitely to have occurred in New York, Mississippi, Pennsylvania, New Jersey, Connecticut, Ohio, Indiana, and Iowa on tomatoes in the fields and in the greenhouses. Miss Mary K. Bryan of the Bureau of Plant Industry found the disease in 1924 associated with Fusarium wilt. Two fields near Cleveland, Ohio were severely affected with both diseases. Sometimes one plant would be infected with the two organisms. Because of certain similarities in the symptoms, and because of this association, pathologists should be careful to distinguish between the two diseases.

In 1924 collaborators reported the disease from Connecticut, where it was first observed July 26 at Wallingford, from Erie County, Pennsylvania, and from Ohio where it was noted both in the greenhouse and in the field causing moderate damage. Collaborators in Illinois suspect that it was present in tomato fields of that state although no certain diagnosis was made.

LEAFMOLD CAUSED BY CLADOSPORIUM FULVUM CKE.

The states of New York, Pennsylvania, New Jersey, Kentucky, Florida, Indiana, and Iowa, and Porto Rico report leafmold in 1924. In New York it was very important in greenhouses. It was never known to be any worse in the greenhouses in the vegetable section about Rochester. Collaborators in Pennsylvania, New Jersey, Indiana, and Iowa also indicate that it was most important in greenhouses. In Kentucky, however, it reduced the yield in many fields, causing losses of 25% in some cases.

M. W. Gardner of Indiana reported not only the infection of foliage, but also a black stem-end rot of fruit caused by this fungus.

BLOSSOM-END ROT, NON-PARASITIC

Blossom-end rot was widespread where soil moisture conditions favored its development. Judging from the reports received, it was for the most part no more severe than usual and was probably subnormal if anything, in prevalence. A greater and more uniform supply of moisture than usual favored it suppression in many parts of the country.

Table 75. Estimated losses from blossom-end rot, 1924.

Percentage reduction in yield	States reporting
6	Mississippi
5	Georgia, Texas
4	North Carolina, Iowa
2	New York, New Jersey, South Carolina, Alabama, Arkansas.
1	North Dakota, New Mexico, Arizona

The following remarks concerning varieties were given in collaborator's reports.

New Jersey: Slight loss in many fields of Earliana and Greater Baltimore varieties. (Poole)

Georgia: Florida Special most susceptible variety noted. (Boyd)

Mississippi: No varietal differences noted on ten varieties. (Neal & Wallace)

Missouri: Severe on Early Stone at Columbia. (Maneval)

North Dakota: No varietal difference noted. (Weniger)

OTHER DISEASES

Bacillus aroideae Town., bacterial soft rot - Has recently been reported by Wingard (6). It is capable of causing severe losses in Virginia. It attacks green fruit especially and is a wound parasite. The organism has been studied and reported on by A. D. Massey (3).

Colletotrichum phomoides (Sacc.) Chester, anthracnose - Reported from New York, New Jersey, Indiana, and Illinois causing rot of ripe fruit. In New Jersey it caused severe loss of canning tomatoes; in some fields all ripe tomatoes were affected, especially during the latter part of the picking season. First observed July 25 in Burlington County, New Jersey and Adams County, Illinois; September 5, Indianapolis, Indiana; September 10, Tompkins County, New York.

Corticium vagum Berk. & Curt., soilrot - Rotting of fruit in the fields from this organism was reported as general and of some consequence in Florida. A trace was reported from Texas and it was serious in one garden at least, in Indiana, on fruit touching the soil. Considerable loss is also mentioned as occurring in the Norfolk section of Virginia.

Fusarium sp., fruitrot - In one garden in Tompkins County, New York, about 5% of the fruit was rotted with a Fusarium, red in culture, and with 5 - 6 septate spores. (Chupp)

Heterodera radicicola (Greef) Muell., rootknot - Reported from the southern states and from Kansas, New Mexico, Arizona, and California. In New Jersey it was observed in several greenhouses, and in Kansas where it is often an important factor in greenhouses, it was reported as causing trouble in the field. The following estimates of losses were reported: Georgia 5%, Texas 0.5%, New Mexico 5%, and Arizona a trace. In California it occasionally destroyed more than 75% of the crop in certain local sandy areas according to Shapovalov.

Oospora lactis parasitica F. J. Pritchard & W. S. Porte, fruitrot - Mentioned as causing heavy loss in some fields in New Jersey, especially to canhouse tomatoes which were cracked and dead ripe. R. F. Poole (4) has recently reported on this.

Phoma destructiva Plow., blackspot - G. F. Weber makes the following statement for Florida: "Ripe rot (Phoma destructiva Plow.) was of considerable importance in the state during the past year. It was of first rank as a transit disease and caused considerable loss. It was well distributed." In North Carolina a crate of tomatoes shipped in from Florida in April was badly diseased. The rot was confined mostly to the stem-end of the fruit. L. E. Miles of Alabama reported less than last year and says that it was of negligible importance. One field in Mobile County, however, showed 40% fruitrot and it was observed in a few other fields in that section. The disease was also reported from three counties in Illinois.

Phyllosticta sp., leafspot - This leafspot was reported for the first time from Florida where it was collected at Quincy on June 20. It caused spots on the leaves very much resembling nail-head spots but more circular and larger. The disease appeared during the rainy season about the time the fruit began to ripen, and practically ruined the plants in a one-acre field within the period of two weeks.

Phytophthora sp., stem girdle - This disease, described by Reddick in 1920, was reported this year only from New York where it was observed in one infected greenhouse near Ithaca, April 17. The grower bought diseased plants.

Phytophthora infestans Mont. & D By., late blight - This disease occurred in abundance in Giles County, Virginia. Infection first appeared about August 1 according to Fromme and by August 15 the blight had become general enough to attract notice of the growers. The loss probably averaged 50% for the canning section of Giles County. It was noted also infecting tomatoes slightly on the college farm at State College, Pennsylvania, October 6.

Phytophthora terrestris Sherb., buckeye rot - In Florida, buckeye rot was general over the state during 1924 but caused less damage than in 1923 according to G. F. Weber. In Indiana one specimen was found on August 16 in the plot at Lafayette where it occurred last year. From Michigan a Phytophthora rot was reported from a greenhouse but the exact identity of the species has not been reported at yet.

Sclerotium rolfsii Sacc., stemrot - Reported from a number of southern states during 1924, and also from Porto Rico and the Philippine Islands. For the most part it was not of great importance but in South Carolina, where it was very much more prevalent than usual, it was of much importance. In Beaufort County, South Carolina alone it was estimated that 50% loss occurred on account of this disease and death of mature plants was common throughout the coastal region. J. A. B. Nolla of Porto Rico reported as high as 80% injury in certain instances.

Blossom drop, cause unknown, was a serious factor in the production of a good crop in several localities in Florida and was very prevalent in Texas according to G. F. Weber and J. J. Taubenhaus respectively.

A dying back of tomato plants in California was reported by Michael Shapovalov, August 10 as follows:

> "A peculiar trouble, not previously reported in the literature, showed this season in a number of widely separated localities. It manifests itself in the majority of typical cases as dying back of the branches down to about 7 to 12 inches from the apex. Black longitudinal streaks appear on the affected stems from the outside. This 'streaky' cortex, coupled with greater brittleness of the diseased portions, reminds one of the potato 'streak'. In the majority of typical cases brown patches in the pith can be observed. Last year this trouble was noted for the first time in Santa Clara County and in the Suisun-Fairfield region. This year a severe outbreak of it is to be found in some fields in Santa Cruz County and in Los Angeles County (Some at Baldwin Park, but especially south of Gardena where more than 50% of the plants are affected, some every branch being killed back). A few scattered specimens have been found this year in Alameda, Santa Clara and Stanislaus Counties. None so far near Bakersfield or near Riverside. Isolations from the discolored patches of the pith have so far yielded no organism. There is no definite evidence that the disease is of a virus nature."

A leafcurl of undetermined cause affected from 5% to 10% of the plants in certain localities in southeastern South Dakota. Diseased plants were dwarfed, deep green in color and the leaves were decidedly brittle. The leaf edges were curled up (spoon shaped) and the blades were thicker than normal. Plants affected set no fruit. (Petry)

Powdery mildew, cause undetermined. One report of this mildew was received from Porto Rico by Mel T. Cook.

Streak, cause undetermined. In 1922, Gardner and Kendrick (1) suggested that this disease might be a manifestation of mosaic. Vanderpool (4) now reports experiments in which he transmitted the disease successfully. Healthy tobacco plants inoculated by rubbing with striped tomato plants developed mosaic, and a healthy tomato plant rubbed with leaves of mosaic tobacco contracted stripe.

Although this disease has been reported from a number of the states in the northeastern quarter of the country and from Kansas and the Pacific Coast, the only states reporting it this year were New York, Pennsylvania, and Washington. In New York an estimated loss of 0.5% to the greenhouse crop was reported. No loss was mentioned as occurring in the field. In Pennsylvania it was only noted in the greenhouse at State College where it was affecting 5% of the plants of the spring crop.

Miscellaneous references on tomato diseases:

Cited

1. Gardner, M. W. and J. B. Kendrick. Tomato mosaic. Indiana Agr. Exp. Sta. Bul. 261: 1-24. May 1922.

2. Massey, A. B. A study of Bacillus aroideae Town., the cause of a soft rot of tomato, and B. carotovorous Jones. Phytopath. 14: 460-477. Oct. 1924.

3. Poole, R. F. A new fruit rot of tomato. Ann. Rept. New Jersey Agr. Exp. Sta. 43 (1921-22): 566. 1924.

4. Vanderpool, T. C. The stripe or streak of tomatoes in Quebec. Ann. Rept. Quebec Soc. Prot. Plants 16: 116-123. 1925.

5. Wingard, S. A. Bacterial soft rot of tomato. Phytopath. 14: 451-459. Oct. 1924.

Not cited

Bewley, W. F. Mycological investigations. Ann. Rept. Exp. & Res. Stat. Nursery & Mark. Gard. Industr. Devel. Soc. 9: 66-69. 1924.

————, and J. Shearn. A root disease of the tomato caused by Colletotrichum tabificum (Hallier pro parte) Pethybridge. Ann. Appl. Biol. 11: 244-251. 1924.

Hotson, J. W., and Lena Hartge. A disease of tomatoes caused by Phytophthora mexicana sp. nov. (Abstract) Phytopath. 14: 121. 1924.

Riker, A. J. The influence of temperature and of previous infection on the development of crowngall. (Abstract) Phytopath. 15: 45. Jan. 1925.

Schenk, P. J. Sclerotiumziekte van de tomaten. Floralia. 45: 526-527. Aug. 1924.

SWEET POTATO

STEMROT CAUSED BY FUSARIUM BATATATIS WOLL. AND F. HYPEROXYSPORUM WOLL.

As usual this disease was reported from the majority of the sweet potato producing states. Negative reports, however, were received from Louisiana and Texas. It is gratifying to note that the losses from this disease are gradually being reduced in some states at least, through the use of certified plants and field inspection. This fact was particularly mentioned by collaborators from Tennessee and Mississippi in 1924.

The disease is important locally in many sweet potato states but the most serious damage apparently occurred in the southeastern Iowa section, where it was extremely serious according to D. R. Porter. The disease was present in approximately 90% of the fields in that state killing the young plants, stunting the older ones, and causing a loss estimated at 25%.

Table 75. Estimated percentage loss due to stemrot, 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
25	Iowa	4	Maryland
15	New Jersey	2	North Carolina, Alabama, Arkansas
10	Mississippi	1	Arizona
8	Delaware	0.5	Georgia
7	Kansas		
5	Virginia		

Table 76. Dates of first appearance, 1924.

Date	Location	Date	Location
June 9	Gloucester Co., N.J.	July 5	Jackson Co., Miss.
June 10	Pima County, Ariz.	July	Muscatine Co., Iowa.
June 24	Sussex Co., Del.		

The following facts concerning varietal susceptibility were reported.

New Jersey: The White Yam and Red Brazil were not attacked by the disease and give much promise of the coming important commercial varieties in this state. (Poole)

Tennessee: Found chiefly on Nancy Hall because this is the most common variety, but also observed on six other varieties. (McClintock)

Alabama: Triumph very resistant. (Miles)

Literature:

Poole, R. F. Stem rot does not affect all sweet potatoes. Triumph and White Yam varieties show great resistance to the disease. New Jersey Agr. 6: 6. March 1924.

—————. Sweet potato varieties that produce well and are resistant to stem rot on sassafras sands. (Abstract) Phytopath. 15: 48. Jan. 1925.

—————. The stem rot of sweet potatoes. Losses, sources of infection, and control. New Jersey Agr. Exp. Sta. Bul. 401: 1-32. 1924.

BLACKROT CAUSED BY SPHAERONEMA FIMBRIATUM (ELL. & HALS.) SACC.

Judging from the reports received from the majority of sweet potato states, blackrot was not more prevalent than usual and in fact seemed to be subnormal in prevalence. In Mississippi and Tennessee the reduction in amount of blackrot was attributed to the quarantine and seed and plant inspection service, while in Alabama and Louisiana it was mentioned that the dry season suppressed the disease. In New Jersey heavy loss occurred in certain isolated areas, being especially serious where potatoes were injured by wire worms or soilrot. In Tennessee the disease was serious where untreated or uncertified seed was used, especially in the western part of the state. The chief injury there is to the plants and to the potatoes at harvest time. In South Carolina it was noted especially in plant beds: in Mississippi it was general but not very serious anywhere. In Texas it was said to be very prevalent and in Arkansas it was important.

The following table of losses gives a better idea of the relative importance in the different states.

Table 77. Estimated percentage loss in 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
9	Iowa	1	Maryland, Alabama, Louisiana, Arizona
8	Tennessee, Texas		
5	Arkansas	0.5	Delaware, South Carolina, Kansas
3	Virginia, North Carolina	0.2	New Jersey
2	Georgia, Mississippi		

Concerning varietal susceptibility O. C. Boyd wrote that in south Georgia the Jersey potato and Nancy Hall were more susceptible than Porto Rico, and from Iowa D. R. Porter also reported that the Nancy Hall was more susceptible than Porto Rico and stated further that seed treatment was giving very fine results.

In Kansas also excellent results have been obtained from seed treatment for the control of blackrot. In 1922 about 20 growers tried it with substantial increases in yield. In 1923 potatoes for over 500 acres were treated with excellent results; increases in yield being obtained even in the absence of blackrot and the losses from blackrot in storage being reduced. According to E. A. Stokdyk the average yield from treated plots was 277.1 bushels per acre while the average from untreated plots was 208.5 bushels per acre, or an increase due to treatment of 68.6 bushels. Stokdyk estimates that in 1924 about two-thirds of the commercial acreage was treated.

SOILROT CAUSED BY CYSTOSPORA BATATA (ELL. & HALS.) ELLIOTT

During the past year Manns (2) has continued investigations on the cause of soilrot (pox) and has come to the conclusion that it is probably not due to Cystospora batata but rather to an undetermined Actinomycete. He produced soilrot artificially in the greenhouse, using sterilized soil to which ground sweet potato tissue containing lesions was added. Further work is in progress. In 1924, New Jersey, Delaware, and Maryland all reported 0.5% loss: Texas reported 1% and Mississippi, Louisiana, and Kansas each reported a trace.

Literature:

1. Adams, J. F. The use of sulphur as a fungicide and fertilizer for sweet potatoes. Phytopath. 14: 411-423. 1924.

2. Manns, T. F., and J. F. Adams. Department of Plant Pathology and Soil Bacteriology. IN annual report of the Director for the fiscal year ending June 30, 1923. Delaware Agr. Exp. Sta. Bul. 135: 25-48. Jan. 1924.

3. Poole, R. F. The pox disease of sweet potatoes. Results of recent experimental control methods. Disease also called soilrot or ground rot. New Jersey Agr. 6: 6-7. Feb. 1924.

4. ———— The relation of soil moisture to the pox disease of sweet potatoes. (Abstract) Phytopath. 15: 48. Jan. 1925.

SCURF CAUSED BY MONILOCHAETES INFUSCANS ELL. & HALS.

Scurf, impairing the appearance of the potatoes and causing shrinking in storage, was reported as generally distributed, but of slight importance, from fourteen of the sweet potato states. The Department of Plant Pathology of New Jersey reported that experimental results have shown that the disease advances rapidly in September and October and that where digging was delayed until late October, the potatoes were more severely affected than those dug earlier in the month.

STORAGE ROTS

Table 78. Losses from storage rots, including soft rot caused by Rhizopus, as reported by collaborators, 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
25	Tennessee, Texas, Arkansas	5	South Carolina, Georgia, Arizona
15	Maryland	3	Kansas
13	Iowa	2	Louisiana
10	Alabama, Mississippi	1	New Mexico
6	North Carolina		

OTHER DISEASES

Albugo ipomoeae-panduranae (Schw.) Sw., white rust - New Jersey, Delaware, Mississippi, Arkansas, and Porto Rico reported white rust.

Cercospora sp., leafblotch - Collected in 1923 at Gainesville, Florida.

Corticium vagum Berk. & Curt., stemrot - More of this was reported from Delaware than usual, it being very prevalent on sprouting beds.

Diaporthe batatatis (Sacc. & Syd.) Harter & Field, dryrot - Reported by O. C. Boyd from south Georgia as of considerable importance, mostly as a storage rot but causing a stemrot in fields and beds, and causing a reduction in yield estimated at 2% for the state.

Diplodia tubericola (Ell. & Ev.) Taub., Java blackrot - Reported by O. C. Boyd as of considerable importance in south Georgia. Traces occurred in Texas according to Taubenhaus.

Fusarium oxysporum Schl., surface rot - Neal and Wallace of Mississippi reported this disease as probably general in the state and causing some damage as a storage rot.

Ozonium omnivorum Shear, rootrot - According to J. J. Taubenhaus this rootrot was prevalent in Texas causing from 10 to 50% loss in the black lands and averaging perhaps 4% for the state as a whole.

Plenodomus destruens Harter, footrot - Traces were reported from Maryland, Tennessee, and Kansas.

Phyllosticta batatas (Thuem.) Cke., leafspot - Reported only from Porto Rico by Mel T. Cook.

Pythium sp., rootlet rot - Reported by Harter (5) from various states.

Sclerotium bataticola Taub., charcoal rot - Texas, a trace: and reported for the first time from Iowa where it was very slight according to D. R. Porter.

Sclerotium rolfsii Sacc., stemrot - Reported by O. C. Boyd as of some importance in south Georgia.

Septoria bataticola Taub., leafspot - There was a slight outbreak of this disease during July in New Jersey, according to the Department of Plant Pathology, but only slight damage was caused.

Mosaic - More of the disease called mosaic has been reported in 1924 than ever before from South Carolina. A trace was observed August 14 in Florida. It was seen in the vicinity of Gainesville and reported from Oxford, but it was not as prevalent as in 1923. In Alabama it was observed in Lee and Mobile Counties, and reported from Cullman County; the loss was negligible, however. From Mississippi it was reported from 30 counties whereas in 1923 it was only observed in one county. This increase might be due to inspectors overlooking the disease last year. In Arkansas it was prevalent practically all over the state according to the Department of Plant Pathology. Inspectors of the State Plant Board estimated losses of 0.2% in Phillips County and 0.1% in the state. These reports were based on fields inspected for certification so that the amounts were probably higher on the ordinary stock.

Mottle necrosis is a disease reported on by L. L. Harter (4) at the Washington meeting. Harter is inclined to think that it is due to a species of Pythium which is constantly associated with the disease. Mottle necrosis was also reported from New Jersey by R. F. Poole as severe in the Vineland section and worse than last year. It caused a soft decay of the roots before harvest.

General references:

1. Adams, J. F. The use of sulphur as a fungicide and fertilizer for sweet potatoes. Phytopath. 14: 411-423. Sept. 1924.

2. Artschwager, Ernst. On the anatomy of the sweet potato root, with notes on internal breakdown. Jour. Agr. Res. 27: 157-166. 1924.

3. Cook, Melville T. The life history of Nectria ipomoea. Mycologia 15: 233-235. 1923.

4. Harter, L. L. Mottle-necrosis of sweet potatoes. (Abstract) Phytopath. 15: 45. Jan. 1925.

5. ———————— Pythium rootlet rot of sweet potatoes. Jour. Agr. Res. 29: 53-55. July 1924 (issued Jan. 1925).

6. Poole, R. F. Studies of sweet potato diseases. Ann. Rept. New Jersey Agr. Exp. Sta. 43: 554-560. 1921-1922 (1924).

7. ———————— Disease control important to sweet potato industry. New Jersey Agr. 6: 16. June 1924.

8. ———————— Selecting sweet potato seed is big step toward success. Healthy roots cut down losses. New Jersey Agr. 6: 13. Oct. 1924.

9. ———————— Sweet potatoes threatened by another serious disease. Has been found prevalent for three years in succession. New Jersey Agr. 7: 12. Feb. 1925.

10. Speaker, C. Efficient production of sweet potatoes and measures for disease control. Bienn. Rept. Kansas State Hort. Soc. 37: 111-112. 1924.

11. Stokdyk, E. A. Controlling sweet potato diseases. Rept. Iowa State Hort. Soc. 58: 119-122. 1924.

BEAN

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LINDEMUTHIANUM (SACC. & MAGN.) BR. & CAV.

Anthracnose was of most importance in the North Atlantic and Great Lakes States,and in the majority of these states also it was said to have been more prevalent than during 1923. In the South and West the disease was of slight importance or entirely absent. No reports were received from states west of Colorado and New Mexico.

Table 79. Estimated reduction in yield due to anthracnose, 1924.

Percentage reduction in yield	State	Percentage reduction in yield	State
.5	West Virginia, New Jersey, Virginia, Vermont, Michigan, Alabama, Ohio, New Mexico	1	New Hampshire, Mississippi, Wisconsin, South Dakota
1.5	New York, Maryland	0.5	Delaware
		trace	Georgia, Tennessee, Louisiana, Illinois, Minnesota, Iowa, Kansas

In Virginia it was particularly important in the Bird-eye bean sections of Wythe, Carroll, and Floyd Counties in the western part of the state. In Michigan the losses were especially high on canning varieties of snap beans; as high as 100% loss occurring in some fields of canning beans. In New York also the losses were confined largely to snap beans since the dry bean varieties now grown are resistant for the most part.

Table 80. Dates of first appearance, 1924.

Date	Place	Date	Place
April 19	Copiah Co., Miss.	July 20	Green Co., Mo.
May 4	Mitchell Co., Ga.	July 21	Passaic Co., N. J.
May 20	Sussex Co., Del.	Aug.	Ramsey Co., Minn.
June	Knox Co., Tenn.	Aug. 15	Strafford Co., N. H.
July 7	Morgan Co., Ill.	Aug. 20	Rusk Co., Wis.
July 12	Illinois	Aug. 26	San Juan Co., N. Mex.
July 15	Center Co., Pa.		

Extensive plantings of varieties of Robust in Michigan have reduced losses considerably according to the Division of Botany at the Experiment Station. They also report that Red Kidneys were injured severely during 1924.

It is interesting to note that resistant varieties of dry beans have replaced the susceptible ones in New York and that as a result anthracnose is becoming of minor importance to that crop.

BACTERIAL BLIGHT CAUSED BY BACTERIUM PHASEOLI EFS.

The important dry bean states of New York and Michigan experienced more trouble with this disease than usual in 1924. In New York it was much worse than during the previous year, being very destructive in many fields and causing a reduction in yield estimated at about 10% for the state. In Michigan it caused serious losses in nearly all fields. Many fields in counties north of Lansing were killed out during August. Other states where the disease was more destructive than last year were Georgia, Florida, Mississippi, Arkansas, Ohio, Illinois, Minnesota, and Iowa.

Table 81. Estimated losses caused by bacterial blight, 1924.

Percentage reduction in yield	States reporting
10	New York
5	Michigan
4	Virginia, Georgia
3	Alabama, Arkansas
2	Iowa, New Mexico
1.5	Maryland
1	Vermont, South Carolina, Ohio, Mississippi, Texas, Illinois, Minnesota
0.5	Delaware, Arizona
Trace	New Hampshire, West Virginia, Louisiana, Wisconsin, Idaho

In Ontario County, New York it was mentioned that blight was especially bad on beans planted early in the season.

Burkholder (1) has recently published on varietal tests covering a period of three years. His results demonstrate that some varieties possess a certain degree of resistance, and that the more resistant varieties are generally rather late in maturing. Collaborators in New York mention much damage to all varieties except Michigan Robust in Genesee County. From Georgia, O. C. Boyd reported that Kentucky Wonder seemed particularly susceptible but that all varieties were affected. In Arkansas the disease was very common on both pole and certain bunch varieties, and Kentucky Wonder was mentioned as especially susceptible. From Indiana, M. W. Gardner reported, "In a field plot of 61 varieties four escaped infection. These were Bountiful, Dwarf Horticultural, White Marrow, and Challenge Dwarf Wax. Two beans of other species also escaped infection, namely, Scarlet runner (*P. coccineus*) and White Dutch Runner (*P. coccineus albus*)," Gardner (2) has recently reported the occurrence of bacterial blight on the trailing wild bean, *Strophostyles helvola.* This plant is rather widely distributed in the East and in some places is a common weed; naturally it should be considered as undesirable in the vicinity of cultivated beans. Gardner says the identity of the organism was proven by cross inoculations.

Literature cited:

1. Burkholder, Walter H. Varietal susceptibility among beans to the bacterial blight. Phytopath. 14: 1-7. 1924.

2. Gardner, M. W. A native weed host for bacterial blight of bean. Phytopath. 14: 341. July 1924.

RUST CAUSED BY UROMYCES APPENDICULATUS (PERS.) LK.

Rust was reported as occurring in a majority of the eastern states from New York to Kansas and southward. In no state was it of any great importance nor did any state report more than 1% loss. It seemed to be more prevalent than usual in the southern part of Ohio, Indiana, and Illinois. Since the severity of this disease is often limited by its occurrence late in the season, the dates of earliest appearance may sometimes be significant. In 1924 they were as follows: April 20, Thomas County, Georgia; August 4, Pickens County, South Carolina; September 22, Ontario County, New York; September 23, Columbia County, Pennsylvania; and Burlington County, New Jersey; and September 27, Tate County, Mississippi.

In Arkansas it was mentioned as occurring especially on the pinto bean: in Kansas *Strophyostyles pauciflora* was mentioned as a host, and in Indiana, Gardner reported that field tests with 61 varieties confirmed the results of Fromme and Wingard (1) as to varietal susceptibility.

Literature cited:

1. Fromme, F. D., and S. A. Wingard. Varietal susceptibility of beans to rust. Jour. Agr. Res. 21: 385-404. June 15, 1921.

MOSAIC

Mosaic probably ranked third in importance of the bean diseases in 1924. Unlike anthracnose and bacterial blight it was important in the western states and less important in the eastern states. In New York the disease is becoming of less importance on account of the fact that most dry beans now grown are resistant; however, some of the snap bean varieties remain susceptible.

Table 82. Estimated reduction in yield of beans due to mosaic, 1924.

Percentage reduction in yield	States reporting
5	Michigan, Minnesota, Iowa, Idaho
2.5	Pennsylvania, Utah
2	New York, Washington
1	Vermont, New Jersey, Alabama
Trace	Maryland, Virginia, Georgia, Tennessee, Louisiana, Wisconsin, South Dakota, Kansas, New Mexico

In a plot of 61 varieties at Lafayette, Indiana, Gardner reports that 18 escaped mosaic infection. It was noted on White Dutch Runner (*Phaseoli coccineus albus*), and on Wardwells' Kidney Wax, the variety which escaped mosaic in 1921, 1922, and 1923. In Michigan it was especially prevalent on varieties other than Robust, ordinary field beans showing nearly 100% infection in some cases.

OTHER DISEASES

Bacterium flaccumfaciens Hedges, bacterial wilt - Reported as occurring frequently in Michigan by G. H. Coons and R. Nelson.

Cercospora cruenta Sacc., leafblotch - Reported from Georgia, Texas, and Illinois. According to O. C. Boyd of Georgia, the disease was worse than last year and caused less damage to snap beans than to the pole lima beans. The Illinois report is the first to the Plant Disease Survey from that state.

Corticium vagum Berk. & Curt., stemrot - Georgia, Florida, Alabama, Mississippi, Texas, Idaho, and Washington report damage from Rhizoctonia stemrot in 1924. According to Weber it was the worst disease of beans in Florida, being well distributed over the state. In the trucking fields about Birmingham, Alabama, beans were very severely affected, 50% of the vines being attacked in many cases. From other states it was not reported as very serious.

Erysiphe polygoni DC. - Pennsylvania, New Jersey, Florida, Texas, and Arizona reported powdery mildew. This is the first report to the Plant Disease Survey of this disease from New Jersey. It was said to be very prevalent in the other three states and 1% loss was estimated for Texas and Arizona.

Fusarium spp., rootrot - Maryland, Florida, New Mexico, Idaho, and Washington report trouble from rootrot caused by an undetermined species of Fusarium. Some of this may be the same as the dry rootrot mentioned below. In Idaho much more was noted than usual and it was very important in bean fields in the southern part of the state, causing an estimated loss of 2% for the entire state. It was necessary to reseed many fields in southern Idaho on account of this disease, according to Hungerford.

Fusarium martii phaseoli Burk., dry rootrot - Reported from New York as occurring in about the same or less amounts than last year and reducing the yield for the state by about 5%. According to Chupp the disease was confined to the older dry bean sections of western New York.

Heterodera radicicola (Greef) Muell., rootknot,- Prevalent in the sandy soils of the South and was reported by the majority of collaborators in southern states. Three percent loss was estimated for southern Georgia by O. C. Boyd and 1% loss was estimated for Texas by Taubenhaus.

Isariopsis griseola Sacc., leafblotch - Reported from South Carolina and Florida; being fairly common in both states.

Ozonium omnivorum Shear, rootrot - Prevalent in the black lands of Texas causing 3% loss for the state, according to Taubenhaus.

Phyllosticta phaseolina Sacc., leafspot - Reported as causing slight damage in South Carolina.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot - Pennsylvania, West Virginia, and Florida report damage from this Sclerotinia. In West Virginia it was found only at elevations of 3000 feet where it was killing some of the vines in home gardens. In Florida it was reported as prevalent in bean fields, especially on low ground and where the rows were close together with a luxuriant growth of foliage.

Sclerotium rolfsii Sacc., stemrot - South Carolina, Georgia, Alabama Mississippi, and Louisiana all reported damage to beans from Sclerotium rolfsii Sacc. In South Carolina it was of minor importance; in Georgia it reduced the stand in many gardens and fields causing perhaps a 2% loss in the state, particularly in the southern portion. In Alabama it was very prevalent in the trucking region about Birmingham and was second in importance only to Rhizoctonia stemrot. In Mississippi it was serious in some gardens, and in Louisiana it was about as prevalent as usual, causing some loss.

Thielavia basicola (Berk. & Br.) Zopf, black rootrot - Reported from New York.

Chlorosis caused by too much lime was reported from Texas by Taubenhaus.

Tipburn (non-par.) was reported in considerable quantities from Genesee County, New York. Cool wet weather followed by high temperatures was thought to be responsible.

General references:

1. Appel, Otto. Krankheiten der ackerbohne. Deut. Landw. Presse. 51: 62-63. Feb. 1924.
2. Burkholder, W. H. The effect of varying soil moistures on healthy bean plants and on those infected by a root parasite. Ecology 5: 179-187. April 1924.
3. Leonard, L. T. Effect of moisture on a seed-borne bean disease. Jour. Agr. Res. 28: 489-497. May 1924.
4. Nacion, C. C. Study of Rhizoctonia blight of beans. Philipp. Agr. 12: 315-321. Jan. 1924.
5. Welles, C. G. Studies on a leafspot of Phaseolus aureus new to the Philippine Islands. Phytopath. 14: 351-358. Aug. 1924.

LIMA BEAN

Downy mildew caused by Phytophthora phaseoli Thax. was reported only from eastern Long Island, New York; Bustleton, Pennsylvania; and from New Jersey. In the latter state there was somewhat more than during 1923 according to W. H. Martin, but in general it was unimportant. The late season was fairly dry and unfavorable for mildew development.

Bacterial spot caused by Bacterium viridifaciens Tisdale and Williamson (reported by M. W. Gardner as due to B. vignae Gardner and Kendrick). More of this disease than usual occurred in Indiana, according to Gardner.

Bacterial blight caused by Bacterium phaseoli EFS. was reported on lima bean by M. W. Gardner in Indiana. It was not as destructive on this host, however, as on the common bean (Phaseolus vulgaris).

Pod blight caused by Diaporthe phaseolorum (Cke. & Ell.) Sacc. was reported as occurring frequently in Delaware and as unimportant in Pennsylvania. An estimate of 0.2% loss was made for Delaware by J. F. Adams.

Leafspot caused by Isariopsis griseola Sacc. Reported as unimportant in South Carolina but found in a number of places in the state.

Mosaic (undet.) was reported from Pennsylvania, Florida, Mississippi, and Delaware. In Florida typical mosaic symptoms were observed in a field near Plant City. Nearby plants of tomato, pepper, and ragweed were also affected. From Mississippi, Neal and Wallace also reported mosaic as affecting 100% of the plants in one planting in Oktibbeha County.

Rust probably caused by Uromyces appendiculatus (Pers.) Lk. was reported from Pennsylvania by R. S. Kirby and C. R. Orton.

Literature on lima bean diseases:

1. Anderson, H. W. Notes on the Nematospora disease of lima beans. (Abstract) Phytopath. 14: 31. 1924.

ONION

ONION SMUT CAUSED BY UROCYSTIS CEPULAE FROST

Smut undoubtedly occurred throughout its normal range in the northern and eastern portions of the country during 1924, but it was reported to the Survey only from Connecticut, New York, Kentucky, Ohio, Wisconsin, Minnesota, and Iowa.

The following are some of the collaborators' reports concerning prevalence and severity.

Connecticut: One report only. This field had not been in onions for about 15 years. The disease was not bad but the owner will not plant again next year as it would be much worse. (Clinton)

New York: Worse than in the past two years due to the cold, wet, backward spring which prolonged the seedling period. Many fields in Wayne County plowed up in June.

The shifting of the crop to newer muck sections, use of more seed per acre, formaldehyde, and growing of onion sets where smut infested land is still employed for onion raising, have all contributed to minimizing losses from smut. So I would place it at 10% of total crop even though it has been an extra bad smut year. (A. G. Newhall)

Ohio: Of slight importance; disease well controlled in onion growing sections. (H. C. Young)

Wisconsin: Serious in a few fields where formaldehyde was not used; 50 to 75% loss in these cases. (J. C. Walker)

Minnesota: Of normal prevalence. Observed on only one farm. (Sect. Pl. Path.)

Iowa: Severe in southeastern Iowa near Davenport; 5% loss in Pleasant Valley. (D. Porter)

The following statements were given concerning control.

New York: So far formaldehyde and dry sulphur have proved the best fungicides for smut control. (A. G. Newhall)

Recommendation of P. J. Anderson that less water be used proved as effective as the old way of treatment. (E.L.Felix)

Wisconsin: Formaldehyde used in most cases with the usual satisfactory results. Application mostly made with two horse, six row seeder, with two 30 gallon barrels attached. (R. E. Vaughan)

Minnesota: Formaldehyde soil treatment gave excellent results in some of the onion fields near St. Paul. (Sect. Pl. Path.)

Literature:

1. Anderson, P. J. Susceptibility of species of Allium to onion smut. (Abstract) Phytopath. 14: 26. 1924.

2. ———————— Controlling onion smut with kalimat. Phytopath. 14: 569-574. Dec. 1924.

DOWNY MILDEW CAUSED BY PERONOSPORA SCHLLIDENI UNG.

Connecticut, New York, Georgia, Louisiana, and Ohio reported downy mildew in 1924. G. P. Clinton stated that this was the first year he has found the mildew in Connecticut although it was reported in earlier years by Thaxter. It was noted at Westport, Connecticut, July 18, but the damage was minor. In New York the disease was worse than it has been for at least nine years, according to A. G. Newhall, being unusually widespread and appearing early due to the cool July with plenty of rain. The Department of Plant Pathology estimated 10% reduction in yield for the state on account of downy mildew. Only two fields of onion seedlings were observed to be affected by O. C. Boyd in south Georgia, early in January, 1924. The mildew was very destructive in those two fields, however. In Louisiana it was present but not troublesome according to Edgerton, and in Ohio some fields in the onion district were badly affected. An estimate of 1% loss is made for Ohio by H. C. Young.

Variable results were obtained from dusting and spraying in New York, excessive rains preventing effective application of Bordeaux in Genesee County. In Ohio at least one grower applied dust in an attempt to control the mildew.

OTHER DISEASES

Aspergillus niger Van Tiegh., black mold - Reported from Illinois and Texas.

Botrytis sp., graymold - In Indiana this was very destructive to green onions, affecting the lower part of the sheaths of the outer leaves. It is not certain whether or not this is B. allii attacking the onion tops and so it is reported separately. It was first observed May 13 in Cass County. In Wisconsin, J. C. Walker also reported very serious damage to white sets; 30 to 50% of the bulbs in every field examined being affected. A. G. Newhall reported considerable destruction of the outer leaves by Botrytis in Wayne County New York; and Heald and Dana (1) state that in Washington small plants 2 to 4 inches high were attacked by the fungus.

Botrytis allii Munn, neckrot - Neckrot of harvested onions was reported from Pennsylvania, Indiana, Wisconsin, Iowa, Idaho, and Washington.

Colletotrichum circinans (Berk.) Vogl., smudge - Reported on white onion from Indiana, Illinois, Wisconsin, and Kansas. From Indiana it was reported in seven cars of white onions grown in the northern part of the state. In Wisconsin it was very common but of relatively minor importance, causing perhaps 1% loss for the state as a whole. In Kansas it was observed for the first time by members of the Department of Plant Pathology and their report is the first to be received by the Plant Disease Survey from that state.

Fusarium sp., Fusarium bulbrot - Complaints of decay of onion bulbs have been received from Connecticut, Indiana, Wisconsin, Iowa, Idaho, and Washington. The injury occurred mostly on the harvested crop during transit to market.

Fusarium malli Taub., pinkroot - Reported from various places in New York but was less serious than during the past two or three seasons, due to cool weather and frequent rains. It occurred in Louisiana in about the usual amounts and was of considerable importance according to Edgerton. In Texas it was prevalent, causing a loss estimated at 1 to 2%. In Ohio it was quite prevalent in practically all of the onion sections, causing what the growers know as blight. In some places, especially one 200-acre tract, there was about 5 to 8% actual loss, another 1500 acre tract showed from 6 to 8% loss. There were spots in the fields where onions were nearly all destroyed.

From northeastern Iowa reports were received indicating slight damage from a Fusarium rootrot, whether or not this is identical with pinkroot has not been ascertained.

Macrosporium parasiticum Thuem., mold - Reported from New York (never very important); Louisiana (about the same, considerable damage to seed crop); Porto Rico (severe - Cook); Illinois (a mold attributed to Alternaria sp. reported very slight in Fulton County).

Sclerotinia sp., crownrot - Reported for the first time on onion in California (2). This is the first report to the Plant Disease Survey of a Sclerotinia on onion.

Brittle. A new onion disease, temporarily designated as brittle, and thought to be associated with Fusarium spp., was reported to the Survey for the first time by A. G. Newhall of New York, June 30. The leaves are much coiled and both leaves and root tips are brittle and the latter swollen although not discolored. A Fusarium has been isolated from diseased leaves. Entire fields or only portions of them may be affected. It is fairly widespread in Monroe County according to Newhall.

Dodder was observed on onions in Genesee and Orleans Counties, New York, by E. L. Felix.

Smudge, of unknown cause, was noted in South Carolina this year and is under investigation.

Literature on other onion diseases:

Cited

1. Heald, F. D. and B. F. Dana. Notes on plant diseases in Washington - 1. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

2. Smith, E. H. Some diseases new to California. (Abstract) Phytopath. 14: 125. Feb. 1924.

Not cited

Campanile, G. Su di una nuova malattia dell'aglio dovuta ad "Helminthosporium allii" nov. sp. Nuovi Ann. Agr. Min. Econ. Naz. Italy 4: 87-106. Jan. 1924.

Sideris, C. P. Species of Fusarium isolated from onion roots. Phytopath. 14: 211-216. May 1924.

Taubenhaus, J. J. and F. W. Mally. The culture and diseases of the onion. New York, E. P. Dutton. 1924.

Teodoro, N. G. A study of a Macrosporium disease of onion. Philipp. Agr. Rev. 16: 233-275. 1923.

Walker, J. C. White rot of Allium in Europe and America. Phytopath. 14: 315-322. July 1924.

———— Further studies on the relation of onion scale pigmentation to disease resistance. Jour. Agr. Res. 29: 507-514. Nov. 1924.

DISEASES OF CRUCIFERS

CABBAGE

YELLOWS CAUSED BY FUSARIUM CONGLUTINANS WOLL.

Yellows occurred in at least 20 states from Long Island, New York, westward to Iowa, Colorado, and Texas, and southward to Georgia. The following 10 states reported that the disease had not been observed nor reported during the year: Connecticut, North Carolina, South Carolina, Louisiana, Michigan, Minnesota, North Dakota, South Dakota, Idaho, and Washington. A number of collaborators mention geographic distribution within their states as follows: New York, Long Island; New Jersey, southern portion; Maryland, Baltimore County especially; Virginia, general in Floyd, Wythe, and Smyth Counties; West Virginia, general but only occasionally seen in gardens and commercial fields; Tennessee, reported from West Tennessee and from market gardens in middle Tennessee; Georgia, two specimens from northern section of state; Alabama, not much in southern part but up to 50% infection in fields about Birmingham; Mississippi, only two reports from northern Mississippi; Arkansas; Ohio, Indiana and Illinois, general; Wisconsin, in southeastern Wisconsin; Iowa and Kansas, general.

Less of the disease than last year was reported from New Jersey, Delaware, Indiana, Wisconsin, Iowa, and Kansas, and a number of reports attribute this fact to low temperatures. The increasing use of resistant varieties is also responsible for a reduction in losses from yellows, and was mentioned especially in the case of Wisconsin, where the disease is confined principally to the southeastern portion and is of relatively minor importance for the state as a whole. On the other hand certain states such as Tennessee and Ohio reported more than usual and more than last year. In Tennessee yellows is said to be increasing in severity annually and is being introduced on plants from outside the state. Undoubtedly the causal Fusarium is continuing to spread into new cabbage sections through shipments of diseased cabbage seedlings and accompanying infested soil.

Yellows continues to be the most serious cabbage disease. A glance at the accompanying table will show that the average state losses are high in some cases, and in certain local areas crops have practically been destroyed.

Table 83. Estimated loss from cabbage yellows, 1924.

Average percent loss	Maximum percentage infection in any one field	State
20	100	Iowa
12	90	Ohio
10	95	Kansas
8	30	Maryland
8	-	Texas
3	-	Alabama
2	75	New Jersey
0.5	-	New York, Delaware
Trace	25	West Virginia
Trace	-	Georgia, Mississippi, Wisconsin

Cabbage - Yellows

On July 15, C. E. Temple of Maryland reported that in one field of late cabbage just beginning to head, 30% of the plants were dead or dying from yellows. In the early crop in trucking sections a loss of nearly 20% was estimated for Maryland. In Nassau County, New York, practically all fields developed more or less of the disease and in some of them the loss was high. In Kansas, according to Stokdyk, yellows appeared late but ruined about 10% of the fields that had been in cabbage for two years and on badly infested soil as high as 78% of yellows developed.

Table 84. Dates of first appearance as reported by collaborators, 1924.

Date	Location	Date	Location
May 6	Webster Co., Miss.	July 2	Floyd Co., Va.
June	Gibson Co., Tenn.	July 3	Gloucester Co., N. J.
June 1	Fulton & Cobb Cos., Ga.	July 17	Mifflin Co., Pa.
June 4	Reno Co., Kans.	July 20	Racine Co., Wis.
July 1	Muscatine Co., Iowa		

Collaborators made the following statements concerning varietal susceptibility.

Maryland: Thirteen resistant varieties were tested in Baltimore County with good results. (Temple & Jehle)

Kentucky: Wisconsin-Allseason satisfactory on infested land. (Valleau)

Indiana: "Indiana Yellows Resistant" giving good satisfaction. This is a selection from Louisville Drum Head. (Gregory)

Wisconsin: Resistant strains grown almost exclusively on sick soil. (Vaughan)

Iowa: Iacop most resistant; Copenhagen very susceptible. (D.R.Porter)

Kansas: Selections of Copenhagen by Melhus and selections by Stokdyk showing good promise. (Stokdyk)

Literature:

Anon. Relation of environment to health and disease in plants. Wis. Agr. Exp. Sta. Bul. 362: 47-49. 1924.

Gregory, C. T. Disease resistant cabbage. Hoosier Hort. 6: 24-26. Feb. 1924.

Tisdale, Wm. B. Influence of soil temperature and soil moisture upon the Fusarium disease of cabbage seedlings. Jour. Agr. Res. 24: 56-86. 1923.

BLACKROT CAUSED BY BACTERIUM CAMPESTRE (PAM.) EFS.

The majority of states east of the 100th meridian reported blackrot in 1924. No reports were received from west of that line. In general the disease was relatively unimportant; however, in certain local and commercial areas the damage was high. For instance, in the Norfolk Section of Virginia blackrot was said to be very severe; in certain early cabbage sections of Alabama the loss was serious; and it was destructive in the commercial sections of northern Illinois, being present in about 70% of the fields of the state and causing a loss estimated at 3.5%. The following are the percentage estimates of losses as submitted by collaborators to the Plant Disease Survey: 5%, Alabama; 3.5%, Illinois; 2% Texas; 1% West Virginia, Minnesota, and Iowa.

The disease can be prevented by seed treatment with corrosive sublimate (1-1000 for 30 minutes) and because of the ease of this control measure it should be adopted more generally in those commercial sections where heavy losses from blackrot occur. It is satisfactory to learn that in New York a very large proportion of the cabbage seed is now treated before planting and that as a result blackrot is being almost wholly eradicated. The hot water treatment, which is equally effective against blackrot and more so against blackleg, has been used with good results in a number of states. The latter treatment, however, must be used with caution because of the possibility of injuring the seed. During the year directions for control have been published(1). The symptoms of blackrot and blackleg are given, together with methods and reasons for seed treatment.

Literature:

1. Walker, J. C. Cabbage-seed treatment. U. S. Dept. Agr. Circ. 311: 4. April 1924.

BLACKLEG CAUSED BY PHOMA LINGAM (TODE) DESMAZ.

Of the 30 states sending in report cards for this disease, 14 report its nonoccurrence and the remaining 16 report it as occurring for the most part in comparatively slight amounts. In some section, however, it was serious in seed beds and when plants from these beds were set out in the field, heavy losses often resulted. In the important Long Island section it was serious on the late, but not on the early, cabbage crop.

Concerning control the following statements have been received during the year:

New York: A few men treat with hot water (122°F. for 30 minutes). Two years ago, the hot-water method was recommended to farmers, but there was so much injury that the recommendation had to be withdrawn. It has been found that new seed may be heated to 122°F. for 30 minutes with very little loss of germination. Seed that is a year old will often germinate only about 70%, [illegible] and still older seed may not grow at all after such drastic treatment. (Chupp, Extension Pathologist 2: 109. Oct. 1924)

As a result of the above experience the Department of Plant Pathology in New York is recommending the securing of disease free seed grown in fields where the disease is absent and treating this with corrosive sublimate to prevent blackrot, or if the hot water treatment is used, care is taken that the seed is not badly damaged by the treatment.

Indiana: This year seed of the Indiana Yellows Resistant cabbage was treated by the hot water method developed by Dr. J. C. Walker. This seed was thoroughly infested with blackleg and blackrot. It was used in all parts of the state, and in no case was there evidence of injury by the treatment. The disease was completely controlled. (Gregory, Extension Pathologist 2: 109. Oct. 1924)

Wisconsin: The demonstrations on cabbage seed treatment at Racine this year were very satisfactory. Twenty-five percent of blackleg had been common with several farmers during recent years; but this season, following seed treatment by the hot-water method devised by Dr. J. C. Walker, we could find only a trace of blackleg. The seed treatment, however, is not infallible in the control of blackleg, because one farmer planted treated seed in a location where infection from blackleg was carried over in the soil from a previously diseased crop. Plants taken from this seed bed will not yield more than one-tenth of a crop. (Vaughan, Extension Pathologist 2: 110. Oct. 1924)

Iowa: Seed treatment gave good control at Nichols. (Porter)

Literature:

1. Chupp, C. Cabbage-seed treatment in New York. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 109-110. Oct. 1924.

2. Gregory, C. T. Hot water treatment of cabbage seed used in Indiana. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 109. Oct. 1924.

3. Nissley, C. H. Use hot water to control black let disease. New Jersey Agr. 6: 2, 7. March 1924.

4. Vaughan, R. E. Hot water used in Wisconsin. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 110. Oct. 1924.

5. Walker, J. C. Cabbage seed treatment. U. S. Dept. Agr. Circ. 311: 1-4. 1924.

CLUBROOT CAUSED BY PLASMODIOPHORA BRASSICAE WOR.

The states reporting clubroot in 1924 were confined to New England, the Middle Atlantic States and those north of the Ohio and Missouri Rivers.

It was reported from the Puget Sound region of Washington. Fourteen states, mostly in the South, reported that it was not observed or did not occur.

Taken as a whole clubroot was not especially important, but in certain local areas it is often severe, thus in New York, although the disease was statewide, in 1924, it was most common in the Cortland Valley, and in Indiana and Illinois it seemed to be confined to two counties in the northern part of each state.

The outstanding report on clubroot is that from Wisconsin, where it was more widespread than it has been for years, causing complete loss in some instances. Collaborators in New York report more clubroot than the average and in Ontario County it was said to be more common than ever before. It is not unlikely that cool weather favored its development. For the most part the estimates of state losses were less than 1%.

In a recent bulletin, Gloyer and Glasgow (1) have reported apparent control of clubroot in a single experiment where a mercuric chloride solution 1-1280 was applied to plants in the seed bed.

Literature:

Cited

1. Gloyer, W. O., and H. Glasgow. Cabbage seedbed diseases and Delphinium root rots: their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-38. Feb. 1924.

Not cited

Bremer, Hans. Zur frage der bodendesinfektion gegen kohlhernie. Nachrichtenbl. Deut. Pflanzenschutzd. 4: 16-17. March 1924.

——————— Wissenswertes aus der arbeit in- und ausländischer versuchsstationen und institute. 5. Die wirkung von bekämpfungsmitteln auf den erreger der kohlhernie. Deut. Obstb. Zeit. 70: 184-185. April 1924.

——————— Untersuchungen über Biologie und Bekämpfung des Erregers der Kohlhernie, Plasmodiophora brassicae Woronin. 2 Mitteilung. Kohlhernie und Bodenazidität. (Investigations on the biology and control of the causal organism of clubroot of cabbage, Plasmodiophora brassicae Woronin. Second Note. Clubroot and soil acidity.)--Land. Jahrb., 59: 673-685. May 1924.

——————— Die wirkung des kalks bei der kohlhernie bekämpfung. Nachrichtenbl. Deut. Pflanzenschutzd. 4: 73-74. 1924.

Darnell-Smith, G. P. To control clubroot of cabbage. Agr. Gaz. New South Wales 7: 488. 1924.
Mentions control in seed bed by sprinkling soil with corrosive sublimate (2 oz. to 2 gallons water).

Kindshover, T. Erfolgreiche bekämpfungsveruuche gegen die kropfkrankheit oder hernie der kohlgewachse. Mitt. Deut. Landw. Ges. 39: 259-260. April 1924.

Lindfors, T. Bidrag till kannedomen om klumprotsjukans bekampande. (Contribution of knowledge of the control of club-root) Kungl. Landtbr. Akad. Handl. och Tidskr., 63: 267-287. 1924.

Monteith, J. Relation of soil temperature and soil moisture to infection by Plasmodiophora brassicae. Jour. Agr. Res. 28: 549-562. May 1924.

See also references under stemrot.

STEMROT CAUSED BY CORTICIUM VAGUM BERK. & CURT.

In a recent publication Gloyer and Glasgow (3) have distinguished three types of injury due to Corticium vagum (Rhizoctonia), namely, damping-off, wiry tap root, and stem canker. All of these types of injury may be found in the seed bed on young cabbage plants. New York is the only state reporting this injury in 1924. From Ontario County, J. E. Connelly reported the damping-off and wiry root types of injury as causing considerable damage where corrosive sublimate was not applied to the seed beds.

Gloyer and Glasgow have also reported (1, 2, 3) that the mercuric chloride treatment that is used for the control of cabbage maggot, whereby two or three applications of the 1-1200 corrosive sublimate are made to the seedlings in the plant beds, has given successful control of these various types of Rhizoctonia injury.

Literature:

1. Glasgow, H., and W. O. Gloyer. The mercuric chloride treatment for cabbage maggot control in its relation to the development of seed bed diseases. Jour. Econ. Ent. 17: 95-101. 1924.

2. ―――――――――――――――― Mercuric chloride as a preventive of certain damping-off fungi. Science n. s. 59: 338. 1924.

3. Gloyer, W. O., and Hugh Glasgow. Cabbage seedbed diseases and Delphinium root rots: Their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-38. Feb. 1924.

OTHER DISEASES

Alternaria brassicae Berk. & Curt., black leafspot - New York, Pennsylvania, Delaware, Maryland, South Carolina, Georgia, Florida, Ohio, Indiana, and Wisconsin. In New York there was very much less than usual and Chupp suggests that this fact may be due to a temperature or possibly sunlight relation. The other states report it as prevalent in about normal amounts but in none of them was the damage very great or important.

Bacillus carotovorus Jones, softrot - This disease, serious to the harvested crop, and known on the market as slimy softrot, continued to cause heavy losses in transit. The Survey has the following records of the occurrence of this disease in the field.

Vermont: Infection and damage as usual, 1% to 2%. (Gilbert)

New York: Mostly on Long Island, trace in field cabbage, 3 to 5% in seed beds. (Chupp)

Pennsylvania: General throughout state, important on late cabbage. (Orton)

Maryland: About average, 0.5% damage. (Temple & Jehle)

Alabama: Caused slight loss in fields in southern part of state. (Miles)

Wisconsin: Less than last year or average year. Of minor importance. (Vaughan)

Iowa: Common in early fields in southeastern Iowa. (Porter)

Kansas: Few heads, scattered in fields. (Stokdyk)

Bacterium maculicolum McC., peppery leafspot - Two reports of this disease on cabbage were received by collaborator G. P. Clinton from Tolland and New Haven Counties, Connecticut. This disease has been reported to the Survey in past years from Connecticut, New York, Alabama, Louisiana, and Mississippi.

Cercospora bloxami Berk. & Br., leafspot - This leafspot was reported from Illinois for the first time in 1924. Tehon reported its occurrence in three counties in that state. It was practically of no economic importance, causing only slight spotting of a few leaves. The disease has been recorded previously from Florida and Texas.

Heterodera radicicola (Greef) Muell., rootknot - Alabama, Texas.

Internal blackspot, non-par., - Washington.

Peronospora parasitica (Pers.) D By., - downy mildew - Reported as follows:

New York: More than last year. Important in a few fields. Observed on almost mature heads as well as on young plants. (Chupp)

Maryland: Worse than usual in the Coastal Plain Section. Favored by wet weather. (Temple & Jehle)

Florida: Reported from many parts of the state, especially attacking young plants in the seed bed. (Weber)

Mississippi: Damage slight. (Miles)

Louisiana: Less. Some loss to young plants. (Edgerton)

Texas: Very prevalent on early cabbage, 10% loss. (Taubenhaus)

Indiana: More than usual but not serious; favored by wet season. (Gardner)

Washington: Reported from Puget Sound Region. (Heald)

Pythium debaryanum Hesse - Damping off of young plants attributed to this fungus, but with which Rhizoctonia might well have been associated, was reported from Pennsylvania, Iowa, South Dakota, and Washington.

Sclerotinia sclerotiorum (Lib.) Mass., watery softrot - This disease not only caused heavy losses in transit and storage as usual but was reported as follows from the field:

New York: Important on late harvested kraut cabbage; caused perhaps 1% reduction in yield. (Chupp)

South Carolina: Scattered plants found in all fields in Charleston section. No great damage at any one place, however. (Moore)

Florida: Some damage to cabbage in head while standing in field. Quite common during past year although rather rare previously. (Weber)

Louisiana: Not so much as usual. (Edgerton)

Sclerotium rolfsii Sacc., stemrot - South Carolina and Texas.

Stem-end rot (undet.) - Porter of Iowa reports this as a shipping trouble, some cars showing 20% of the heads infected.

General references on cabbage diseases:

Walker, J. C. Observations on the cultivation and diseases of cabbage and onions in Europe, 1922. Plant Dis. Reporter, Suppl. 32: 1-34. Feb. 1924.

——————— Resistant varieties and disease-free seed save cabbage industry. Wisconsin Hort. 14: 117-118. April 1924.

CAULIFLOWER

Blackrot caused by Bacterium campestre (Pam.) EFS. New York, Maryland, Virginia, Illinois, and Iowa are the states reporting blackrot on cauliflower in 1924. At the Washington Meeting, Clayton (2) reported on the mode of infection and method of spread of the blackrot organism, and in another recent publication (2) he has reported on its control by means of seed treatment and seed-bed treatment. The hot water seed treatment (122°F 25-30 minutes) proved much more effective against the organism but also more injurious to the seed than corrosive sublimate. It is, therefore, not recommended for general and promiscuous use on a large scale. Three applications of corrosive sublimate 1-1000 to the soil in seed beds gave excellent blackrot control.

Blackleg caused by Phoma lingam (Tode) Demaz. New York, Pennsylvania, and New Jersey. According to Clayton the disease was favored on Long Island by wet weather during the plant bed period, and isolated fields showed from 25 to 95% infection. The past two years, however, have not been favorable for seed infection on Long Island. Excellent results in controlling blackleg by seed treatment with hot water and also by the treatment of seed beds by corrosive sublimate (1-1000) have recently been reported by Clayton (2).

Clubroot caused by Plasmodiophora brassicae Wor. Destructive locally in New York, Pennsylvania, and Western Maryland according to collaborators. Recent experiments by Gloyer and Glasgow (3) have shown that the corrosive sublimate seed-bed treatment for maggots is effective against clubroot.

Black leafspot caused by Alternaria brassicae (Berk.) Sacc. New York - Not important. Florida - Common but of no importance. Illinois - Apparently no marked injury.

Peppery leafspot caused by Bacterium maculicolum McC. Connecticut, New York, and Florida report this leafspot. Several reports were received in Connecticut; it was quite serious in plant beds on Long Island, New York; and in numerous gardens about Quincy, Florida, it was said to be destructive. A brief account of this disease has recently been given by Clayton (1).

Downy mildew caused by Peronospora parasitica (Pers.) D By. More than last year in New York, unimportant however.

Stemrot caused by Corticium vagum Berk. & Curt. Reported from Delaware County, New York as a damping-off and from Erie County, New York as wiry tap root. It was also reported to the Survey from the state of Washington.

Whiptail, caused by unfavorable soil conditions, was prevalent on Long Island, New York, where it presented a serious problem. This disease has recently been described by Clayton (1) who reports that applications of lime caused a reduction in the amount of whiptail.

Literature:

1. Clayton, E. E. Investigations of cauliflower diseases on Long Island. New York State Sta. Bul. 506: 3-15. 1924.

2. ———— Second progress report of blackrot (Pseudomonas campestris) investigations on Long Island; seed infection and seasonal development. (Abstract) Phytopath. 15: 48-49. Jan. 1925.

3. Gloyer, W. O., and Hugh Glasgow. Cabbage seedbed diseases and Delphinium rots: their relation to certain methods of cabbage maggot control. New York (Geneva) Agr. Exp. Sta. Bul. 513: 1-38. Feb. 1924.

4. Weimer, J. L. Alternaria leafspot and brownrot of cauliflower. Jour. Agr. Res. 29: 421-441. Nov. 1924. (Rec'd Jan. 1925) Alternaria brassicae

KALE

Blackrot, Bacterium campestre (Pam.) EFS. Unusually severe in Norfolk section of Virginia according to McWhorter.

Blackleg, Phoma lingam (Tode) Desmaz. Virginia.

Downy mildew, Peronospora parasitica (Pers.) D By. Virginia.

White rust, Albugo candida (Pers.) Kuntze. Collected on kale at Larkins, Florida, where this host was severely attacked, according to Weber.

Ringspot, Mycosphaerella brassicicola (Fr.) Lindau. Washington (new host according to Plant Disease Survey records.)

Powdery mildew (undet.) Reported from western Washington.

BRUSSELS SPROUTS

Blackrot, Bacterium campestre (Pam.) EFS. Reported from the Norfolk section of Virginia.

Downy mildew, Peronospora parasitica (Pers.) D By. Observed July 7 on Long Island, New York where it was plentiful in seed beds. Some growers used weak Bordeaux mixture as a spray for control.

CHINESE CABBAGE (PETSAI CABBAGE)

Drop, Sclerotinia sclerotiorum (Lib.) Mass. Recently reported from Massachusetts by W. H. Davis (1).

Nematode (undet.) The following report concerning a leaf disease of Chinese cabbage seedlings in Texas has been furnished by J. J. Taubenhaus.

> "During the winters of 1920 and 1921, Chinese cabbage seedlings were grown in the greenhouse at the Texas Agricultural Experiment Station for transplanting purposes in the field. The seed were sown about February and germination appeared to be normal. The seedlings apparently started out well, producing three or four secondary leaves, but within a short time after were found to lag, remaining stunted, shriveling and dying. Examination of the affected leaf tissue showed it to be filled with a leaf nematode which greatly resembled Aphelenchus olesistus Ritzema Bos. This organism is mentioned by Clinton as attacking leaves on begonias, ferns, and geraniums."

Mosaic (undet.) This disease was reported as being collected in the Philippine Islands, February 1923 by Ocfemia (3) and in Kunkel's recent publication (2) he reports the occurrence of intracellular bodies in the mosaic tissues of Chinese cabbage resembling those found in corn.

Literature cited:

1. Davis, W. H. Drop of Chinese cabbage and common cabbage. (Abstract) Phytopath. 15: 50. Jan. 1925.

2. Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. April 1924.

3. Ocfemia, G. O. Notes on some economic plant diseases new in the Philippine Islands. Philippine Agr. 13: 163-166. Sept. 1924.

KOHLRABI

Downy mildew, Peronospora parasitica (Pers.) D By. Local damage to plants in seed beds in Florida.

COLLARD

Blackrot, Bacterium campestre (Pam.) EFS. Reported as affecting collards in the Tidewater Section of Virginia by F. P. McWhorter, but the statement is made that collard is decidedly more resistant than kale or the other cabbage types.

RUTABAGA

Blackrot, Bacterium campestre (Pam.) EFS. Wisconsin. Of minor importance.

Downy mildew, Peronospora parasitica (Pers.) DeBary. Florida.

Mosaic. Indiana. Occurred in disease-garden alongside of a row of turnips. (Gardner)

MUSTARD

Downy mildew, Peronospora parasitica (Pers.) DeBary. Collected in Florida.

White rust, Albugo candida (Pers.) Kuntze. New York (statewide), and Florida (rather common).

TURNIP

Gray leafspot, Alternaria herculea (Ell. & Mart.) J. A. Elliott. Florida (Caused very little damage even though well scattered. Weber)

Leafspot, Cercosporella albo-maculans (Ell. & Ev.) Sacc. Georgia.

White rust, Albugo candida (Pers.) Kuntze. Texas (prevalent).

Powdery mildew, Erysiphe polygoni DC. Washington.

HORSERADISH

Gray leafspot, Alternaria herculea (Ell. & Mart.) J. A. Elliott. New Jersey (More than last year, abundant in some localities, particularly in central and southern Jersey).

Leafspot, Ramularia armoraciae Fckl. Illinois and Washington.

Leafspot, Cercospora armoraciae Sacc. Illinois (Most common disease).

White rust, Albugo candida (Pers.) Kuntze. Illinois and Colorado.

Nematode, presumably Heterodera radicicola (Greef) Muell. Illinois (Caused much damage in Adams County).

Mosaic (undet.) Illinois. "A condition very suggestive of mosaic was seen in Brown and Marshall Counties." (Tehon)

Rootrot (undet.) Poole (1) has recently reported losses from a rootrot of horseradish roots in storage pits. Losses were reduced when the roots were rolled in sulfur before pitting. The trouble is apparently due to a bacterium.

Literature cited:

1. Poole, R. F. Investigation of the horseradish rootrot. Ann Rept. New Jersey Agr. Exp. Sta. 43 (1921-22): 560-561. 1924.

RADISH

White rust, Albugo candida (Pers.) Kuntze. New York, Pennsylvania, Indiana, Wisconsin, and Colorado. Of slight importance only.

Blackrot, Bacterium campestre (Pam.) EFS. Traces observed in New York, Pennsylvania, and New Jersey.

Blackroot, Pythium aphanidermatum (Edson) Fitz. Observed as unimportant in Pickens County, South Carolina, but serious in home gardens in a number of places in Indiana. Especially destructive near Indianapolis in market gardens on the variety Cincinnati Market.

Clubroot, Plasmodiophora brassicae Wor. West Virginia. First report from that state.

Podrot, Phoma sp. Collected on the mature seed pods of white radish at Gainesville, Florida.

Softrot, Bacillus carotovorus L. R. Jones. A single collection from Tompkins County, New York.

DISEASES OF CUCURBITS

CANTALOUPE

LEAFBLIGHT CAUSED BY MACROSPORIUM CUCUMERINUM ELL. & ARTH.

Leafblight was probably the most important disease of cantaloupe in 1924. In Michigan the crop was a failure, largely due to this blight, and an estimate of 90% loss was made by the Division of Botany of the Michigan Agricultural Experiment Station. In Georgia ~~also~~ it was very serious, blighting the leaves early in the season and causing a reduction in yield for the state estimated at 40%. Other state losses are: Delaware 20%; Texas 10%; New Jersey and Maryland 8%; Indiana 4%. In the latter state it was said to have ruined the crops in Jackson and Morgan Counties.

From New Jersey the Department of Plant Pathology reported that on a plot sprayed five times with 3-4-50 Bordeaux mixture 2% of the leaves were dead on September 12, as compared with 50% for unsprayed plots and 30% for those dusted with copper-lime dust. Gardner and Gregory reported that one grower in Allen County, Indiana controlled the disease by two applications of Bordeaux mixture at 200 pounds pressure.

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

Connecticut, New York, Delaware, Maryland, Georgia, Ohio, Illinois, Michigan, Iowa, and Arizona reported bacterial wilt. For the most part it was relatively unimportant, but it caused losses estimated at 15% for Iowa, where it was serious, 5% for Ohio and Illinois, and 2% for New York. In Illinois it was probably the outstanding cantaloupe disease of the season, being unusually severe and directly correlated with an unusual abundance of striped and twelve-spotted cucumber beetles.

ANTHRACNOSE, COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose was very important in Illinois and Iowa in 1924, according to collaborators, and was responsible for 5% and 6% losses in Georgia and Arizona respectively. Other states reporting the disease were New York, Maryland, South Carolina and Louisiana.

DOWNY MILDEW, PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

Seven states along the Atlantic seaboard, Connecticut, New Jersey, Delaware, Maryland, Virginia, South Carolina, and Florida, reported downy mildew in 1924. It occurred, however, in much less amounts than last year and for the most part was not important. In Delaware and South Carolina the reduction in severity is attributed to late attack which of course was influenced by the weather.

Experiments in control of downy mildew of cantaloupe by dusting with copper arsenate to which lime and nicotine sulphate were added were reported from the Delaware Experiment Station (1). It was found that control could not be secured by this means under weather conditions favorable for the fungus. Heavy applications gave no greater control than a light and even distribution.

Literature cited: (See also references at end of cantaloupe section)

1. Manns, T. F. and J. F. Adams. Report of Department of Plant Pathology and Soil Bacteriology. Delaware Agr. Exp. Sta. Bul. 135: 25-46. 1924.

MOSAIC (UNDET.)

Connecticut, Indiana, Illinois, and Iowa reported cantaloupe mosaic. For the most part it was relatively unimportant, however, in Iowa it was said to be serious, causing a loss estimated at 5% for the state. One five-acre field in southern Iowa was totally ruined.

OTHER DISEASES

Bacterium lachrymans EFS. & Bryan, angular leafspot - Reported to the Survey for the first time on cantaloupe from Illinois and Iowa. In the latter state it was said to be severe around Muscatine but for the state as a whole it was very slight.

Cercospora cucurbitae Ell. & Ev., leafspot - Delaware (more than usual, practically of no importance. Adams)

Cladosporium cucumerinum Ell. & Arth., scab - Connecticut and New York. Much more than usual reported from the latter state.

Erysiphe polygoni DC., downy mildew - Florida and Texas. Reported as common.

Fusarium spp., causing wilt - Reported from Arizona.

Fusarium spp., causing fruitrot - Reported by one grower in Berrien County, Michigan, as being important and troublesome for several years.

Heterodera radicicola (Greef) Muell., rootknot - Prevalent in Georgia, Texas, and Arkansas, and reported from Washington and California.

Sclerotium rolfsii Sacc., stemrot - South Carolina (of little importance) and Texas (3% loss).

Yellow leaf (non-par.) - Prevalent on vines in Maryland before being sprayed or dusted, according to Jehle and Temple.

General references:

Adams, J. F. Dusting cantaloupes for the control of some diseases and insects. Univ. Delaware Ext. Serv. Circ. 14: 1-14. 1924.

Del Curto, J. M. Cantaloupes are worth fighting for. Valley Farm, & Citrus Grow. 2: 5, 20, 21. May 1924.

Jehle, R. A., and S. T. Potts. Dusting and spraying cantaloupes. Maryland Agr. Exp. Sta. Bul. 263: 169-180. April 1924.

Lyle, C. Controlling melon pests. Quart. Bul. State Plant Board Mississippi 4: 25-29. 1924.

Nissley, C. H. Insure your melon crop by spraying and dusting. New Jersey Agr. Exp. Sta. 6: 2-3. Jan. 1924.

CUCUMBER

BACTERIAL WILT CAUSED BY BACILLUS TRACHEIPHILUS EFS.

Sixteen states east of the Great Plains reported bacterial wilt in 1924. It was one of the major cucumber diseases in New York, Pennsylvania, West Virginia, Ohio, Indiana, Illinois, and Iowa. In most of these states also it was more prevalent than last year. In Illinois it was the outstanding disease of cucumber, as it was also with cantaloupe. Fields were observed where 50% of the plants were affected and the average loss for it was estimated at 10% by L. R. Tehon. Other estimates of losses were: Ohio 20%; Iowa 15%; Pennsylvania 5%; New York 4%.

ANGULAR LEAFSPOT CAUSED BY BACTERIUM LACHRYMANS EFS. & BRYAN

Angular leafspot was reported from New York, Delaware, South Carolina, Georgia, Florida, Indiana, Illinois, Wisconsin, and Iowa. Although it was more abundant than usual in the majority of these states, none of them reported a loss of more than 1%. The report from New York is of special interest as it is the first from the western part of the state, previous New York reports being from the Long Island section exclusively. In both Monroe and Livingston Counties, New York the disease did considerable damage. The report was accompanied by specimens.

In Florida, G. F. Weber estimates a loss of 5%, infection occurring early during cool weather but being checked as the temperature increased. From Wisconsin, where it was discovered in various parts of the central section of the state, it was reported for the first time in several years.

Good results from seed treatment with corrosive sublimate (1-1000, ten minutes) were reported by J. R. Springer (2). The U. S. Department does not recommend the ten minute treatment on account of delayed germination. According to W. W. Gilbert (1), a five minute treatment is effective and not detrimental to the seed, especially if the treatment is followed by fifteen minutes washing in running water.

Literature cited:

1. Gilbert, W. W. Cucumber seed treatment recommended in the United States Department of Agriculture. U. S. Dept. Agr. Office Coop. Ext. Work, Extension Pathologist (mimeogr.) 2: 111. Oct. 1924.

2. Springer, John R. Seed treatment and spray successful in Florida. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 111-113. Oct. 1924.

ANTHRACNOSE, COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

Anthracnose did not appear to be very destructive to the cucumber crop as a whole. Massachusetts, Maryland, West Virginia, Georgia, Florida, Indiana, Illinois, and Wisconsin reported it as prevalent in about normal amounts. Massachusetts and Indiana mention the fact that it was noted only in greenhouses. No state reported more than 0.5% loss.

MOSAIC (UNDET.)

Mosaic ranked among the most important of the cucumber troubles, being reported from a considerable number of eastern states and from New Mexico and Washington. The following losses were reported: Wisconsin 20%; New York 10-20%; Iowa 15%; Delaware 5%; Illinois 3%; and Pennsylvania 2%. On Long Island, New York, mosaic was epiphytotic and, according to Clayton, reduced the pickle crop by 75%. Quite a few growers abandoned cucumbers owing to the extremely severe losses from mosaic. In Indiana it was said to be a limiting factor in the pickle crop. Gregory found one greenhouse crop practically ruined. In Illinois much more than usual was reported and heavy local losses occurred according to Tehon. In Wisconsin it was widespread and very destructive, and as indicated by the 20% loss estimate, was the major disease of cucumbers in the state and presents a serious problem.

Reference:

Anon. Mosaic disease of cucumbers and tomatoes. Fruit Flow. & Veg. Trades Jour. 45: 533. May 10, 1924.

DOWNY MILDEW, PSEUDOPERONOSPORA CUBENSIS (BERK. & CURT.) ROSTEW.

States along the Atlantic Coast from Connecticut to Florida were the ones reporting downy mildew in 1924. In general the disease was of comparatively slight importance, but in south Georgia, O. C. Boyd reported it as prevalent, in many cases killing entire fields. It occurred late, however, usually after the crop was either harvested or discarded on account of low prices. In spite of that fact, an estimate of 10% reduction in yield was made for south Georgia. In Florida it was widespread in cucumber sections but not so severe as in 1923. The principal damage was done in south Florida while central and northern sections escaped. Collaborators in the states of Virginia and West Virginia mention finding the disease on late cucumbers in the fall.

OTHER DISEASES

Cladosporium cucumerinum Ell. & Arth., scab - New York, Pennsylvania, and Wisconsin. Much more than usual reported from all threestates. The disease is said to be relatively rare in Pennsylvania but in one field of one-half acre this year, 75% loss occurred.

Erysiphe cichoracearum DC., powdery mildew - Massachusetts, Georgia, Texas, and Indiana. In Massachusetts and Indiana it was noted in greenhouses only.

Fusarium niveum EFS., wilt - Ohio, 0.5% reduction in yield.

Heterodera radicicola (Greef) Muell., rootknot - New York (greenhouse, 4% loss). Mississippi, Texas (2% loss), Ohio (one of the most serious troubles with greenhouse cucumbers), Indiana (serious in greenhouses), and Washington.

Macrosporium cucumerinum Ell. & Ev., leafblight - Maryland, 2% loss; and south Georgia, 1% loss.

Phyllosticta cucurbitacearum Sacc., leafspot - Georgia.

Pythium sp. - Reported occurring as a cottony rot of North Carolina cucumbers on the market and also as a damping-off of young plants in South Carolina.

Sclerotinia sclerotiorum (Lib.) Mass., stemrot - New York and Washington.

Reference:

Garbowski L. Helminthosporium cucumerinum sp. n. nuisible aux Concombres. (Helminthosporium cucumerinum n. sp. injurious to cucumbers.) - Bull. Acad. Polonaise des Sciences & Lettres, Sér. B., Sci. Naturelles, 1923: 15-20. 1924.

WATERMELON

ANTHRACNOSE CAUSED BY COLLETOTRICHUM LAGENARIUM (PASS.) ELL. & HALS.

This was probably the most serious disease of watermelon in 1924, being important in New Jersey, South Carolina, Georgia, Indiana, Illinois, Iowa, and Arizona. Other states reporting it to the Survey were Florida, Mississippi, Ohio, and Kansas. The following losses were reported: South Georgia 25%; New Jersey and Iowa 15%; Maryland and South Carolina 10%; Arizona 7.5%; and Illinois 5%. In Kansas the Irish Gray melon showed some resistance when compared with Tom Watson.

Table 85. Yield of watermelons on dusted and sprayed plots in South Georgia, 1924 (C. C. Boyd).

Record on four pickings of mature melons weighting 18 pounds or more	Plat treatment				
	Spray 1	Spray 2	Dust 1	Dust 2	Check
Total number of melons per acre	590	627	534	642	217
Average weight of melons (Pounds)	27.8	27.9	26.4	26.0	29.6
Poxed melons (percentage)	25.9	20.2	20.6	18.7	71.0
Sunburned from premature defoliation %	0	0	0	0	50.0
Ill shaped melons, necks, etc., percent	15.7	18.2	21.0	18.0	25.4
Total percentage unmarketable	33.4	30.9	30.5	27.5	77.4
Number marketable melons per acre	393	433	371	465	50
Market value per acre ($)*	47.60	67.20	41.80	49.20	6.60
Net value per acre less cost of application	41.00	58.35	26.20	23.90	6.60

Spray (1) 4-4-50 Bordeaux, Spray (2) 4-4-50 plus Kayso at 2 pounds per 100 gallons.
Dust (1) Copper-lime dust 25-75, home mixed, Dust (2) 27-75 commercial (Skinner's).
* Based on net prices received by the Sowega Melon Growers Association for cars shipped on the dates of the four pickings.

Records were kept of the cost of spray and dust treatments and Mr. Boyd estimated that the total cost per acre including materials, labor, and mixing was as follows:

Spray 1 - $6.60 Dust 1 - $15.60
Spray 2 - 8.85 Dust 2 - 25.30

O. C. Boyd, stationed at Thomasville, Georgia, conducted spraying and dusting experiments for the control of watermelon anthracnose during 1924. Two spray mixtures and two dust mixtures were used, seven applications being made, the first on May 6 and the last July 16. The results of this work were reported at the annual meeting of the Southern Division of the American Phytopathological Society at Atlanta, Georgia, February 2 and 3, and are given in Table 85.

Literature:

Lyle, Clay. Watermelon anthracnose (Colletotrichum lagenarium)In Controlling melon pests. Quart. Bul. Mississippi State Plant Board 4: 29. April 1924.

FUSARIUM WILT, FUSARIUM NIVEUM EFS.

Atlantic and Gulf Coast States from New Jersey to Mississippi reported frequent cases of Fusarium wilt but for the most part it was not said to be of great importance in that region. However, in Texas, Arizona, and New Mexico it was very prevalent, causing losses estimated at 5% in Texas and 20% in New Mexico. Some areas are so badly infested in the latter state that commercial growing has been discontinued.

In the watermelon growing districts of Illinois and Iowa wilt was said to be a limiting factor in the production of a crop. In Illinois it was general in all melon districts causing a loss estimated at 15% for the state, while in Iowa a 1% loss probably occurred.

From Kentucky the following report was received:

> "Specimens of wilting vines have been received from Maysville, Kentucky, from the Charleston Bottoms where watermelons have been grown for at least the past five years on a commercial scale. The disease first appeared last year in small areas but is quite widely distributed this year and is reported to be ruining most of the melon patches.

> "A fungus is readily found in the vascular tissues of wilting vines and the root shows the typical yellow, brown discoloration of the wilt." (Valleau)

OTHER DISEASES

Bacillus tracheiphilus EFS., bacterial wilt - Georgia, Florida, Texas, Iowa, New Mexico, and Arizona.

Cercospora citrullina Cke., leafspot - South Georgia, Texas, and Indiana.

Diplodia sp., Diplodia rot - From Florida a stemrot of young vines due to Diplodia was reported. From Texas a stem-end rot of fruit was reported. In Arizona blossom-end rot, causing a loss estimated at 5%, and associated with Diplodia and other fungi, occurred, and in Maryland a stem-end rot of uncertain cause was reported by Temple and Jehle as causing a 1% loss.

Erysiphe cichoracearum DC., powdery mildew - Georgia.

Heterodera radicicola (Greef) Muell., rootknot - Georgia, Florida, Texas, and New Mexico. In the latter state it was of considerable importance, causing a loss estimated at 5%.

Macrosporium cucumerinum Ell. & Ev., leafspot - Georgia and Indiana.

Mycosphaerella citrullina (C. O. Smith) Gross., stemblight - More than last year in Florida according to Weber; reported also from Georgia.

Phyllosticta cucurbitacearum Sacc., leafspot - Collected at Maysville, Kentucky in August.

Pseudoperonospora cubensis (Berk. & Curt.) Rostow., downy mildew - Georgia, Florida, and California (1).

Sclerotium rolfsii Sacc., stemrot - Florida.

Bastard blossom was reported from Texas by J. J. Taubenhaus as follows:

> "In working with watermelon diseases in Texas, the writer has frequently noticed watermelon plants which appeared very peculiar in the sense that instead of producing normal male and female blossoms, these were found to proliferate and to form a large cluster of numerous deformed small flower buds. From afar, plants thus affected appear like rosette. Clinton found a similar condition on onions, The cause of this condition is as yet unknown."

Literature:

1. Smith, E. H. Some diseases new to California. (Abstract) Phytopath. 14: 125. Feb. 1924.

2. Stuckey, H. P. Important diseases of the watermelon. In Watermelons. Georgia Agr. Exp. Sta. Bul. 143: 125-131. Feb. 1924.

SQUASH

Bacterial wilt, Bacterium tracheiphilus EFS. Connecticut, moderate injury; New York, trace.

Bacterial leafspot, cause uncertain but possibly due to Bacterium lachrymans EFS. & Bryan was serious in at least two fields in south Georgia according to O. C. Boyd. It produced a characteristic spot of leaves and fruit and was first observed June 1, at Pavo, Georgia.

Downy mildew, Pseudoperonospora cubensis (Berk. & Curt.) Rostew. was collected in several different localities in Georgia but was not severe in any case.

Mosaic (undet.) Georgia, Texas, and Kansas reported traces of mosaic.

Storage rot, Botrytis cinerea Pers. Washington.

> "This was an active rot observed on fully mature squashes stored under rather dry conditions. The parasite gained entrance through the stem ends although the stem had been uninjured and the squashes had been handled very carefully when harvested and put into storage. The surface showed a water-soaked appearance, and a cut through the affected part displayed a rather soft, although not a wet, rot advancing on the interior a little ahead of the water-soaked area on the surface. The squash fruits deteriorated much more rapidly than when attacked by species of Alternaria or or Penicillium. This is another occurrence of Botrytis which has not been recorded in the literature available to the writers." (Heald & Dana)(1).

Powdery mildew, Erysiphe cichoracearum DC. Virginia and Georgia.

Brownrot, Choanephora cucurbitarum (Berk. & Rav.) Thax. Three reports from Connecticut.

Anthracnose, Colletotrichum lagenarium (Pass.) Ell. & Hals. Connecticut.

Fruitrot, Fusarium sp. Connecticut.

Fusarium wilt, Fusarium spp. Texas, prevalent.

Rootknot, Heterodera radicicola (Greef) Muell. Georgia, Texas, Washington.

Black mold, Rhizopus nigricans Ehr. Connecticut, Texas, and Washingtor From Texas, J. J. Taubenhaus writes as follows:

> "In Texas, great losses frequently occur in squash fields due to a softrot of the fruit. Mature squashes suddenly turn soft and leaky within twelve to twenty-four hours and finally become covered with the fruiting fungus of Rhizopus nigricans Ehr. Under field conditions, it was noticed that infection usually begins at the place of the dead clinging corolla and from there the organism works into the fruit and causes it to rot. Moreover, soft rot is frequently found to follow injuries of the squash bug.
>
> "The causal fungus was readily isolated in pure culture and artificial inoculations carried out on mature squash fruit still clinging to the vine in the field. Successful inoculations were only obtained where the spores of the causal organism were introduced through a puncture. Under field conditions, perfect control was obtained by merely removing the dead corolla shortly after fertilization."

Literature:

1. Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington 1. Botrytis Diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

PUMPKIN

Bacterial leafspot (undet.) was reported independently by collaborators from Indiana, and Illinois. These are the first reports to the Survey of a bacterial leafspot on pumpkin. In Indiana, Gardner reported that the spots were small, angular, blackened, and some showed white centers. When lesions were cut in water-mounts bacteria oozed out in abundance.

Mosaic (undet.) Peoria County, Indiana, September 10.

Powdery mildew, *Erysiphe cichoracearum* DC. Washington.

CELERY

BACTERIAL BLIGHT CAUSED BY BACTERIUM APII JAGGER

Bacterial blight was unusually prevalent in New York and Michigan during 1924. Cool, wet weather was apparently favorable for its development in those states. Foster and Weber (2) report that this disease has not been found in Florida.

In a recent publication Dye and Newhall of New York (1) have reported that copper fungicides, in the form of either sprays or dusts, are very effective in the control of this disease. Bordeaux mixture 5-5-50 and copper-lime dust 15-85 proved most efficient of several substances tried over a period of five years. Sulfur fungicides were not effective. Substantial increases in yield amounting from 60 to 130 crates an acre when five to seven applications were made were obtained both by dusting and spraying. Although the dust costs nearly twice as much as the Bordeaux mixture the cost of the material was partly offset by the decreased time and labor required to apply it.

Newhall (3) reported at the Washington meeting that dusting celery seedlings in the seed bed from two to four times with 20-80 copper-lime dust at about weekly intervals greatly reduced subsequent development of the disease. This measure together with spraying or dusting in the field should result in satisfactory control under average conditions.

Literature cited:

1. Dye, H. W., and A. G. Newhall. The control of bacterial blight of celery by spraying and dusting. New York (Cornell) Agr. Exp. Sta. Bul. 429: 1-30. June 1924.

2. Foster, A. C., and G. F. Weber. Celery diseases in Florida. Florida Agr. Exp. Sta. Bul. 173: 23-77. Dec. 1924.

3. Newhall, A. G. Dusting celery seedbeds to control blights. (Abstract) Phytopath. 15: 50. Jan. 1925.

EARLY BLIGHT CAUSED BY CERCOSPORA APII FRESENIUS

The Atlantic Coast States from Connecticut southward to Florida, the Great Lakes States, Missouri, and Colorado reported early blight in 1924. For the most part the disease was of only slight importance, however, in Florida it was abundant and severe, particularly early in the season. During the latter half of the growing season in Florida the disease was only slightly prevalent, apparently being reduced by the occurrence of low temperatures during December 1923 and the early months of 1924. Foster and Weber (1), in reporting on this disease, state that in careful spraying and dusting experiments conducted at Sanford the 4-4-50 Bordeaux mixture applied at the rate of 100 gallons per acre consistently gave better results than other sprays or dusts. They advise the application of Bordeaux in the seedbed as soon as the young leaves begin to develop and thereafter applications every week or ten days, depending on climatic conditions and the amount of blight. Copper-lime dust applied twice a week at the rate of 40 pounds per acre at each application gave about as good control as the Bordeaux mixture applied once a week. The cost of the dust was greater, however. To secure good control, the dust must be applied with a good power driven duster when the plants are wet, and when little wind is blowing.

Klotz (2) has recently published the results of a technical study of the causal organism. Physiological studies, including relation of temperature and acidity to growth of the fungus were reported. High temperatures and factors lowering the vitality of the plants were found to be favorable for the disease. A study of infection of twelve different varieties of celery showed no varietal resistance, and control according to Klotz, is a matter of keeping the plants growing vigorously, that is, in soil of high fertility and good drainage and having an abundance of moisture, supplemented by spraying with Bordeaux mixture.

Literature cited:

1. Foster, A. C., and G. F. Weber. Celery diseases in Florida. Florida Agr. Exp. Sta. Bul. 173: 23-77. Dec. 1924.

2. Klotz, L. H. A study of the celery early blight fungus, Cercospora apii Fresen. Michigan Sta. Tech. Bul. 63: 1-34. 1923.

YELLOWS CAUSED BY FUSARIUM SP.

New York, Indiana, Michigan, and North Dakota reported yellows in 1924. Its presence in Florida was suspected, but A. C. Foster of the U. S.

Department of Agriculture reported that he did not find it in a survey of the Bradentown and Sanford sections. On March 8 he wrote as follows:

> "I made the trip to the Bradentown section this last Thursday and Friday. I thought it rather important that we determine definitely this season whether or not Fusarium yellows of celery was present in that section. There was nothing present that would even lead one to suspect the presence of the yellows disease. The whole trouble could easily be attributed to poor or hasty setting of young plants in the field, the roots being doubled up, the ends being exposed to the sun, which resulted in the stunting and yellowing of the plants. I have observed the same condition in the Sanford section many times."

In the states reporting yellows there seemed to be less of the trouble than usual. In Indiana, Gardner wrote that the low temperature checked it, and in Michigan, Nelson states that due to the cool wet season the disease was not serious. The mid-season crop at Kalamazoo, Michigan showed 5 to 10% of the plants of the yellow varieties infected but many of these outgrew the disease with the onset of cooler weather. On May 29, G. H. Coons wrote as follows:

> "Celery growers around Kalamazoo are trying Eberle's 'Wonderful' celery on yellows soil. Resistance of this variety to the Fusarium disease is unknown. The yellows-resistant seed has been released for trial on diseased soil on about 20 farms and has been sent to collaborators who have reported yellows in three or four states."

Recent literature:

Butler, L. F. Celery yellows. Phytopath. 14: 435. Sept. 1924.

Thomas, R. C. A Fusarium disease of celery. Month. Bul. Ohio Agr. Exp. Sta. 9: 88-90. May-June 1924.

LATE BLIGHT CAUSED BY SEPTORIA APII ROSTR.

Connecticut, New York, New Jersey, Pennsylvania, Florida, Porto Rico, Indiana, Michigan, and Colorado reported late blight in 1924. In most of these states the disease was more prevalent than usual and in New York and New Jersey 10% loss was estimated as due to it. In Pennsylvania from 5 to 6% loss was reported. In Florida, according to A. C. Foster, the cool weather of January, February, and March, which was unfavorable for the development of the early blight (Cercospora), favored the late blight with the result that it became destructive and widespread during March and April. It was decidedly more destructive than the early blight in the Sanford section in 1924.

FOOTROT CAUSED BY SCLEROTINIA SCLEROTIORUM (LIB.) MASS.

Collaborators in New York and Florida reported footrot in 1924. In the former state it was very common in storage houses and reduced the marketable value of the crops from 2 to 5%. In Florida it was probably the most destructive celery disease. Concerning it A. C. Foster of the U. S. Department of Agriculture and located at Sanford, Florida, reported as follows:

> "This disease has probably ranked first in damage to celery in this section this season, it being widespread in its appearance over the entire section, and appearing in December, a month earlier than usual. In several instances the losses ran as high as 60% of the crop, but in most cases the losses would probably be less than 2%. This disease also causes considerable decay in transit, and its severity in the fields has been reflected in the reports from the Market Inspectors from the place of consignment. The unusual severity of this disease is another instance of the favorable conditions produced as a result of the abnormally low temperatures during the three winter months."

OTHER DISEASES

Bacillus carotovorus Jones, slimy softrot. - New Jersey, Iowa, and Washington.

Blackheart (non-par.) - Appeared rather general throughout the Sanford section of Florida, but was not so destructive as in 1923. In California a considerable amount of blackheart was also reported.

Brown stem (undet.) - Rather prevalent in several instances in the Sanford section of Florida. According to Foster there is a browning of the stems beneath the epidermis.

Heterodera radicicola (Greef) Muell., rootknot - Florida and Missouri.

Hollow and pithy stems (undet.) - Caused considerable loss in the Sanford section of Florida, according to A. C. Foster.

Marl disease, associated with excess of lime in the soil - Was causing serious losses in the vicinity of Manchester, Michigan, and was reported from two other counties in the state. Plants were very brittle and the tissue of the stalks burst, turn brown, and slough away. One grower reported $3000 loss.

Mosaic (undet.) - New York, New Jersey, Florida, and Iowa. In all of these states the disease seems to be becoming somewhat more prevalent. In none of them, however, was more than a trace of injury reported.

Redroot (undet.) - Quite generally present both in seed beds and fields in the Sanford section of Florida. Of little consequence, however. (A.C.Foster)

Recent literature:

Foster, A. C. and G. F. Weber. Celery diseases in Florida. Florida Agr. Exp. Sta. Bul. 173: 23-77. Dec. 1924.

Ogilvie, L. Notes on the diseases of celery found in Bermuda. Agr. Bul. Bermuda Dept. Agr. 3: 5-7. June 1924.

Poole, R. F. Celery mosaic. New Jersey Agr. Exp. Sta. Rept. 1922: 567-568. 1924.

DROP CAUSED BY SCLEROTINIA SCLEROTIORUM (LIB.) MASS.

Drop was the cause of much damage, due to losses both in the field, where it was one of the most important diseases of lettuce, and to the harvested crop. It was reported from New York and Ohio, southwestward along the Atlantic and Gulf Coasts to Louisiana. A report was also received from Arizona. In New York, Pennsylvania, and Maryland the reduction in yield was estimated at from 2 to 3% in each state. In Florida it was the most important disease of lettuce, causing as much damage as all other diseases combined, according to Weber. A. G. Newhall reported that it seems to have been on the increase in Wayne County, New York, during the past two years. He found about 10% affected plants.

DOWNY MILDEW CAUSED BY BREMIA LACTUCAE REGEL.

New York, Delaware, Pennsylvania, Ohio, Illinois, Iowa, and Florida reported downy mildew. For the most part it was of only slight importance, although in Florida it was generally distributed and locally destructive. It was of some importance locally in Illinois also. In Iowa it was said to be serious only in greenhouses, as usual. It was much more common in the lettuce sections of New York this year than during 1923.

According to Chupp and Felix of New York, it occurred abundantly in the Elba muck district, but only slight losses were sustained. Big Boston and Unrivaled are among the less susceptible varieties. The New York (not Iceberg) mildewed badly, while May Queen and a French variety known as White Lille were especially free.

Concerning varietal resistance I. C. Jagger (1) has recently reported on tests with a large number of lettuce varieties, eight of which were found to be immune in both California and Florida. These varieties, which appear to be of European origin, are in general unsuited to American conditions. They have, therefore, been crossed with Los Angeles Market or New York with the result that all first generation plants were immune to mildew and second generation plants showed immunity in the ratio of approximately three to one.

Recent literature:

Cited

1. Jagger, Ivan C. Immunity to mildew (Bremia lactucae Reg.) and its inheritance in lettuce. (Abstract) Phytopath. 14: 122. 1924.

GRAYMOLD CAUSED BY BOTRYTIS SP.

New York, Pennsylvania, Virginia, Ohio, and Iowa reported moderate amounts of this disease. In New York there was more than last year and it became more important late in the season with the approach of cold weather. In

Pennsylvania it was only noted in severe form under glass, and in Ohio and Iowa it was for the most part a greenhouse disease.

Recent literature:

Heald, F. D., and B. F. Dana. Notes on plant diseases in Washington. Botrytis diseases. Trans. Amer. Microscop. Soc. 43: 136-144. July 1924.

BOTTOM ROT CAUSED BY CORTICIUM VAGUM BERK. & CURT.

Trouble from this disease was reported from Connecticut, New York, and Ohio. It caused very serious loss throughout Connecticut, especially during the month of July. In New York it was one of the most important lettuce diseases, causing a reduction in yield estimated at 10%, and in Ohio it was mentioned as being very serious in some greenhouses.

TIPBURN (NON-PAR.)

Connecticut: Bighead Boston showed burning of the inner leaves in fields in July. (Clinton)

New York: Nassau County. Serious on leaves which matured in the hot weather during July and August. (Tyler)

Wayne County. Severe on the first crop in July, but became less severe during the season. (Newhall)

Genesee and Orleans Counties. The first crop (July 4) escaped tipburn. The disease was at its height the last week of July. The average loss was about 15%. The variety Unrivaled was injured less than Big Boston. (Felix)

Monroe County. Tipburn showing up in the more mature lettuce and was found in as high as 70% of the heads in one field. (Newhall)

New Jersey: Due to the cold, wet spring tipburn was not as severe on the early as on the late crop. (Dept. Pl. Path.)

Virginia: Norfolk Section. Of little importance in fall crop. (McWhorter)

Idaho: Less than usual in importance. (Hungerford)

A. G. Newhall (1) has recently reported that slowing down the rate of growth of the plants by leaving potash out of the fertilizer and by deep pruning and cultivation at the proper time have reduced the amount of tipburn. Slow growing varieties have been found to be less subject to the disease than rapid growing ones.

Recent literature:

Cited

1. Newhall, A. G. Studies on the tipburn disease of lettuce. (Abstract) Phytopath. 15: 58. 1925.

RIO GRANDE DISEASE (UNDET.)

J. J. Taubenhaus of the Texas Experiment Station has recently furnished the following note in which he reports two new plants affected by this disease.

> "The Rio Grande disease of lettuce was first described by Carpenter on diseased lettuce from the Rio Grande Valley in Texas. Affected leaves appear ruffled, somewhat mottled, undersized, and in time exude numerous reddish, resinous drops. Diseased plants do not form normal heads but proliferate, each head producing countless numbers of adventitious shoots.
>
> "While studying this disease in the lettuce fields in the vicinity of Laredo, Webb County, Texas, the writer has found what appeared to be two new hosts subject to this trouble. The one is the carrot and the other a weed known to the Mexicans in that vicinity as borage plant, a species of Lactuca, probably *L. canadensis* which is greatly relished by Mexican burros. The symptoms of the Rio Grande disease on the borage plant were found to be identical with those of lettuce. On the carrots the symptoms were the same, except that there appeared to be no proliferation or production of adventitious shoots. Both infected borage and carrot plants were collected in the same beds where lettuce was badly affected with the Rio Grande disease.
>
> "Carpenter believes that alkali in the irrigation water from the Rio Grande River is probably conducive to this peculiar lettuce disease. This, however, remains to be proved."

Collaborators in Connecticut and New York report white heart and rabbit ear and those in the latter state indicate that it may be the same as the Rio Grande disease. In Wayne County, New York, Newhall reports that it is always worse on the first crop when insects are abundant. From 3 to 6% loss probably occurred in the Wayne County sections. From Genesee and Orleans Counties Felix reports that the trouble appeared the latter part of July and gradually increased until an average of 2% loss occurred. As high as 50% of the plants in some fields were affected.

From the Tidewater Section of Virginia, where considerable damage is being caused by lettuce diseases, F. P. McWhorter of the Virginia Truck Experiment Station reports a trouble which he is tentatively calling "Newport News Rosette," and which he says resembles the Rio Grande disease to some extent.

BACTERIAL DISEASES

A considerable number of bacterial diseases of lettuce continue to be reported. For the most part the exact identity of these has not been established. Some progress, however, has been made in distinguishing them during the past year as will be noted in the following reports:

Bacterial wilt caused by Bacterium vitians Brown

According to E. L. Felix this disease was found in the Elba district of New York, where it occurred in amounts ranging from 2 to 10%. Although the disease occurred all summer, infection took place chiefly during the cooler and earlier part of the season. Material sent to Miss Brown in the Department of Agriculture, Washington, D. C., and to the Ohio Agricultural Experiment Station was diagnosed as being caused by Bacterium vitians and Aplanobacter rhizoctonia respectively, thus indicating that these two diseases may be the same.

Felix reports that the disease occurred on newly cleared land and that he has strong evidence that it may be seed borne. Concerning the common name of the disease he reports as follows:

> "Miss Brown did not give the disease caused by Bacterium vitians a common name, but since it is a vascular disease resulting in typical wilt symptoms, I have called it 'bacterial wilt.' It is a vascular disease of both leaf and head lettuce, being more severe on the latter. There is no rosette appearance in diseased head lettuce as there is in leaf lettuce, but a pronounced wilting. In the heat of the day affected leaf lettuce becomes flaccid. These are the reasons I used the term 'bacterial wilt' rather than 'bacterial rosette.'"

This disease was also reported with specimens from New Mexico by R. F. Crawford as being very severe on a 600-acre plantation at Los Vegas where it occurred during the latter part of August and early in September.

Bacterial rot (undet.)

In Connecticut, one grower lost 60 to 75% in a planting of Big Boston. The edges of the outer leaves were affected and the interior was often completely decayed. Such heads might look all right but be rotten within. A similar decay was reported from Wayne County, New York, by A. G. Newhall. A soft rot of leaves and often of the entire head were also severe locally in south Georgia, according to Boyd, who estimated the reduction in yield in that part of the state at 5%. Slight amounts of the disease were also noted in Arizona.

Bacterial leafspot (undet.)

Maryland: The lettuce grown last fall was rather severely attacked by a bacterial disease, which began by attacking the lower leaves first, then the next ones above, and so on. In some cases the entire plant was so badly diseased that it was unfit for consumption. The financial loss in specific cases was between five and ten percent. (Temple)

Bacterial stem girdle (undet.)

What appears to be a new disease of lettuce, causing girdling and a stem and rootrot, occurred in a few fields of the Genesee County section of New York, according to E. L. Felix. In some cases 10% infection occurred.

Bacterial slime disease (undet.)

Reported from California by R. E. and Elizabeth H. Smith (1). This disease causes serious losses in the Imperial Valley of California and in shipments from that section. Los Angeles is the most susceptible with Big Boston and Iceberg less so. The causal organism or organisms have not been determined definitely but may be the same as some of those already described.

Recent literature:

1. Mehta, Maneck M., and Emily M. Bevridge. Studies in bacteriosis XII. B. pyocyaneus as a cause of disease in lettuce and the identity of B. marginale with this organism. Ann. Appl. Biol. 11: 318-323. Oct. 1924.

2. Paine, Sydney J., and J. M. Branfoot. Studies in bacteriosis XII. A bacterial disease of lettuce. Ann. Appl. Biol. 11: 312-317. Oct. 1924.

3. Smith, Ralph E., and Elizabeth H. Smith. Bacterial slime disease of lettuce. (Abstract) Phytopath. 14: 122. 1924.

MOSAIC (CAUSE UNDET.)

In New York mosaic was fairly important. In Wayne County it took about 40% of the lettuce crop, according to Newhall and in the Genesee County section it averaged about 3%. In the latter section it has not been found on the variety "New York", according to Felix. In Pennsylvania only a trace was observed, although in one field it was important, and it is probably present throughout the state, according to Beach and Kirby. F. P. McWhorter reported the disease from the Norfolk section of Virginia. In Florida it occurred in the Sanford section and a high percentage was noted by Weber in one Florida field. In New Mexico it caused stunting of a large number of plant, according to R. F. Crawford.

OTHER DISEASES

Cercospora sp., leafspot - Indiana.

Heterodera *radicicola* (Greef) Muell., rootknot - Georgia and Ohio.

Macrosporium *cladosporioides* Desm., - Florida. Observed in two fields where it was bad. (Weber)

Ozonium *omnivorum* Shear, rootrot - Texas.

Pythium sp., damping-off - New York. Found only occasionally throughout the season. (Newhall)

Septoria consimilis Ell. & Mart., leafspot - New York, New Jersey, Pennsylvania, Delaware, Virginia, and Illinois.

Rabbit ear (undet.) - See Rio Grande Disease.

Red stem (non-par.) - Present in both spring and fall lettuce in the Norfolk section of Virginia. (McWhorter)

Sclerotinia minor Jagger, drop - Virginia. Abundant in Newport News section. (McWhorter)

Reference:

Anon. Lettuce disease in Imperial Valley. Amer. Flor. 62: 638-639. April 1924.

PEAS

ROOTROT

In 1924 root rots of peas were prevalent and destructive especially in the older pea growing sections and in fields that have been repeatedly planted with that crop. The following statements from collaborators and others give an idea of the prevalence and severity in various states.

Massachusetts: Causes more damage than all other pea diseases combined. (Osmun)

New York: Nassau County. Very common this season. Complaints received from various sources. It was the most serious disease of peas this year. Twenty-five percent loss was not uncommon. (Tyler)

Genesee and Orleans Counties. High percentage of infection in all pea fields. (Felix)

Monroe County. On June 25, Charles Chupp visited 15 fields totaling 60 acres in Monroe County. In 7 fields a trace of rootrot was found and in one of the 7 the infection was about 1%. In the remaining 8 fields no trace of the disease was observed.

Livingston County. A survey of pea fields in the vicinity of Mt. Morris was made by Doctor Chupp. The only field where rootrot was observed in any appreciable amount was in a section where peas have been grown for a considerable number of years. About 80 acres were inspected in Livingston County.

Erie County. Doctor Chupp visited 12 widely separated fields totaling 30 acres about the time when the peas were ready for harvest. Only traces of rootrot were observed. In one field, however, where peas had been growing continuously for some time there was much loss on account of the disease.

New Jersey: Yields much better than last year in spite of severe rootrot infection. Crop in canning section in Cumberland County best for many years even where rootrot was present. In Camden and Burlington Counties a few fields were a practical failure but the crop was good on many severely infested soils. Worlds Record and Suttons Ideal, the two best varieties out of 40 tested on rootrot soil in 1922, gave excellent yields on rootrot soil this year. Continuous spring rains encouraged rootrot infection but enabled plants to mature a fair crop in spite of the disease. (Dept. Pl. Path.)

Delaware: Generally distributed in commercial fields of Kent and Sussex Counties. It appears to be more prevalent in fields that show neglect of proper feeding and inoculation. An estimate of 1% reduction in yield for the state is made. (Adams)

Maryland: A rather extensive survey has been made this year of the peas grown for canning purposes in Maryland. This survey was conducted in part by each of the following: Jehle, Drechsler, Haskell, Norton, and Temple. It is interesting to note that in some fields practically 100% of the plants are affected, whereas, in other fields the percentage of infection falls as low as about 5%. No fields examined have been entirely free from the disease. The losses incurred from rootrot depend largely upon weather conditions - the drier the weather for the two weeks preceding harvesting, the greater the loss, other things being equal. In other years, fields have been found so badly affected that they were not harvested. Estimated reduction in yield for the state 8%. (Temple)

South Georgia: Considerable damage in the seedling stage. Two percent reduction in yield. (Boyd)

Wisconsin: More than last year or the average year. Of major importance. Causing an estimated reduction in yield for Wisconsin of 8%. This estimate is based on a survey of 688 plantings comprising 5,416 acres. It was noted especially in the central portion of the state and was absent only in a few new localities. (Vaughan)

Utah: In Morgan County, one of the older pea growing areas, rootrot was found generally distributed. In one day's survey in this district, three fields were encountered which showed practically 100% infection. In these it was difficult to find a single healthy plant. Other fields ranged in percent as follows: 15%, 20%, 16%, 30%, 26%, 40%, 52%, 60%. Four other fields studied exhibited only an occasional diseased plant. The majority of the specimens collected during the survey in Morgan County showed what appeared to be a species of Aphanomyces. Drought and late frosts greatly complicated the disease situation and rendered estimates of loss difficult. Independent of other

> sources of yield decrease, however, I feel safe to place the loss in Morgan County due to rootrot at from 13 to 15%. But few fields in Cache Valley showed the rootrot present and in these only an occasional diseased plant was found. This favorable condition is probably related to the newness of the district in pea production. On the other hand, the apparent absence of disease might be associated with the late date on which the survey was made. A few fields showing the Aphanomyces type of rootrot were found in Davis and Weber Counties. No definite estimate of the loss was possible for these areas. (Richards)

In view of the recent work of Drechsler and of Jones (1, 2, and 3) there seems to be little doubt but that the most important primary cause of rootrot is the fungus Aphanomyces euteiches Drechsler. This fungus has now been found in material from New York, Pennsylvania, New Jersey, Delaware, Maryland, Wisconsin, Ohio, Indiana, Illinois, Michigan, Montana, Idaho, Utah, and California. In an examination of fields in Maryland, Delaware, and New Jersey, Drechsler (1) found that in one-fourth of the fields visited not a single plant could be located that was not affected with this parasite. In approximately one-half of the fields he inspected the parasite could be found in more moderate quantity, frequently being present in severe form only in wet situations. In only one-fourth of the fields visited was this form of rootrot either entirely absent or present in a very small quantity. Concerning the losses from the disease and the relation of severity to weather conditions, Drechsler (1) states that the fungus was much more prevalent than usual owing to the wet weather in the early part of the growing season, particularly during May. Fortunately, however, June was also wet and the pea plants, even though with decayed roots, made a fair growth and crop. With a dry June the losses would doubtless have been great.

Other organisms reported as associated with, and causing rootrot of peas in 1924 are Fusarium martii pisi Jones, Pythium spp., Corticium vagum Berk. & Curt., Thielavia basicola (Berk. & Br.) Zopf, and Phoma sp. Some of these reports follow:

Fusarium martii pisi Jones

Drechsler (1) reported that the fungus occurred rather widely in 1924 but at the same time quite sparingly. He isolated it from material collected at the Arlington Farm, Virginia. Fusarium sp. was reported as causing rootrot in Pennsylvania, Alabama, Mississippi, and Colorado.

Corticium vagum Berk. & Curt.

Connecticut, New Jersey, Texas, Iowa, and Washington reported this fungus associated with rootrot, and Drechsler (1) in his isolation studies found it occurring rather commonly but mostly as a secondary rather than a primary parasite. Occasionally, to be sure, lesions of the type characteristic of Rhizoctonia were found in the field.

Pythium spp.

From six to eight distinct species of Pythium were isolated by

Drechsler (1) from pea roots. They appeared to be found more abundantly in secondary rather than in directly parasitic relationship.

Thielavia basicola (Berk. & Br.) Zopf

Reported from Connecticut and New York. One field of peas in Wayne County, New York was reported a total loss on account of Thielavia.

Recent literature:

Cited

1. Drechsler, Charles. Rootrot of peas in the Middle Atlantic States in 1924. Phytopath. 15: 110-114. Feb. 1925.

2. Jones, Fred Reuel. Rootrot of peas in the United States. Rept. Int. Conf. Phytopath. & Econ. Entom. Holland 1923: 203-204. 1924.

3. —————— Soil-inhabiting fungi upon the pea plant and their relation to disease. Phytopath. 15: 59. Jan. 1925.

BLIGHT CAUSED BY MYCOSPHAERELLA PINODES BERK. & BLOX.

New England, New York, New Jersey, Delaware, Maryland, Georgia, Illinois, Wisconsin, and Iowa reported blight. In New Jersey and Delaware only was it reported more prevalent than usual and in the former state only very slight pod injury but considerable damage from leafspot was reported. One percent loss was estimated for the state of Iowa, while only traces were recorded for the other states.

BACTERIAL BLIGHT CAUSED BY BACTERIUM PISI (SACKETT) EFS.

Special attention was paid to this disease by a number of collaborators during 1924, due to the request of the Plant Disease Survey for information and specimens. As a result Bacterium pisi was isolated from material received from collaborators in New York, Delaware, New Jersey, Maryland, South Carolina, Florida, Illinois, and Wisconsin. For the most part the disease was not considered very destructive in these states. However, investigations by Miss Helen Fox, G. H. Martin, and W. D. Moore indicate that the disease was of great importance in South Carolina. The following quotation from a letter from Mr. Moore, dated May 9, indicates the extent of the damage.

> "I have just completed a tour of the southern section of the state, and have found that the sugar pea disease (B. pisi) is very severe on every field examined in that section. I have found but one field in this state that did not show the trouble to a marked degree. I am not in a position to state just what the damage is, but it is safe to say that the loss has been well

> above 75%. The growers in this section are very much discouraged over the outlook for the future, and unless we can find some remedial measures, this crop will go out of existence for us."

Although it is possible that other diseases, particularly rootrots were influential in damaging the South Carolina crop, still it is apparent that bacterial blight itself was serious.

OTHER DISEASES

Erysiphe polygoni DC., powdery mildew - Massachusetts, Alabama, Illinois, and Washington.

Mosaic (undet.) - A mosaic-like disease causing mottling, yellowing and deforming of leaves and stunting of plants was noted in Maryland and New Jersey during the year. Collaborators in New Jersey state that it is apparently becoming of importance, especially on the varieties Little Marvel and Horsford. Much less was noted on Alaska, Thomas Laxton, and others. As high as 10% infected plants were observed in Little Marvel.

Peronospora trifoliorum D By., downy mildew - A second downy mildew on peas, reported for the first time to the Plant Disease Survey, was found near Madison, Wisconsin, June 10 by F. R. Jones and M. B. Linford. Dr. Jones made the determination and reported that the fungus was the same as that occurring on sweet clover.

Peronospora viciae (Berk.) D By., downy mildew - New York, Wisconsin, and Iowa report traces with no particular damage. An undetermined Peronospora, probably P. viciae, was reported from south Georgia.

Septoria pisi West., leafspot - Delaware, Illinois, Michigan, and Wisconsin reported traces of leafspot. No particular damage was recorded.

Septoria flagellifera Ell. & Ev., leafspot - A second Septoria on peas has been distinguished from material collected in Wisconsin during July by M. B. Linford. This is the first report to the Plant Disease Survey of this fungus on peas from any state.

Recent literature:

Buchheim, A. Uromyces pisi (Pers.) Winter. Centralbl. für Bakt. Abt. 2, 60, 22-24: 534-536. 1924.

Moore, W. D. The root and stemrot of the pea. Ann. Rept. New Jersey Agr. Exp. Sta. 43: 572-573. 1924.

Stone, R. E. Preliminary investigations on the rootrot and blight of canning peas. Scient. Agr. 4: 239-241. April 1924.

COTTON

WILT CAUSED BY FUSARIUM VASINFECTUM ATK.

Greater damage from wilt than usual was reported from Alabama, Mississippi, and Louisiana, attributed by collaborators in some of these states to dry weather. The estimated losses are shown in the following table.

Table 86. Estimated percentage loss from cotton wilt, 1924.

Percentage loss	States reporting
6	Arkansas
5	Mississippi
4	Alabama
3	Louisiana
2	North Carolina, South Carolina, Georgia
1	Virginia, Texas, Arizona

In South Carolina reports were received from certain new localities in the Piedmont Section indicating that the disease is continuing to spread there. Since wilt is more prevalent on the light sandy soils it may be of interest to know the percentages of infested fields in several states as reported by collaborators. North Carolina, wilt present in 7% of the fields; South Carolina, 5%; Georgia, 10%; Mississippi, 60%; Arkansas, 50%;

From southern Georgia, O. C. Boyd reports the following varieties resistant: Lewis 63, Tri-Cook, Dixie-Triumph, and Covington-Toole.

Recent literature:

Dastur, J. F. A preliminary account of the investigation of cotton wilt in Central Provinces and Berar. Agr. Jour. India 19: 251-260. May 1924.

Gaudron, J. La disminución de la resistencia del algodón Tangüis al "cotton wilt". La Vida Agr. 1: 425-428. July 1924.

Kottur, G. L. Notes on cotton wilt in the southern Maratha country. Agr. Jour. India 19: 155-159. March 1924.

Shearer, E. Cotton wilt. In experimental work on cotton, 1922. Ann. Rept. Cotton Res. Bd. Min. Agr. Egypt 3: 37-40. 1924.

ANTHRACNOSE CAUSED BY GLOMERELLA GOSSYPII (SOUTHWORTH) EDG.

In general there seemed to be less anthracnose than usual, this fact being partly due to dry weather in the Gulf States. The estimated losses are given in table 87.

The disease was not noted in southern Illinois.

H. W. Barre (1) reported that the sulphuric acid treatment of cotton seed materially reduced infection in the case of anthracnose in South Carolina and that the treatment is being recommended for general practice. In 1924 the difference in favor of treated seed was 150 pounds of seed cotton per acre.

Table 87. Estimated percentage loss from anthracnose, 1924.

Percentage loss	States reporting
4	Georgia
3	Virginia, Mississippi
2	North Carolina
1.5	Alabama
1	Texas
Trace	South Carolina, Louisiana, Arkansas

Recent literature cited:

1. Barre, H. W. Sulphuric acid treatment in South Carolina. U. S. Dept. Agr. Extension Pathologist (mimeogr.) 2: 110. Oct. 1924.

ANGULAR LEAFSPOT CAUSED BY BACTERIUM MALVACEARUM EFS.

While more angular leafspot occurred than in 1923 in Illinois and New Mexico, less of it was noted in South Carolina, Alabama, Louisiana, Arkansas, and Arizona. In general it was a minor disease, although in two states, at least 5% damage was estimated.

Table 88. Estimated percentage loss from angular leafspot, 1924.

Percentage loss	States reporting
5	Georgia, Texas
3	Arizona
2.5	Arkansas
1	Virginia, North Carolina, New Mexico
0.5	Alabama
Trace	South Carolina, Mississippi, Louisiana, Illinois

Table 89. Dates of earliest appearance of angular leafspot, 1924.

Date	Place	State
May	Baton Rouge	Louisiana
May 8		Arizona
June 16	Thomas County	Georgia
July	Knoxville	Tennessee
July 7	Oconee County	South Carolina
July 7	Union County	Mississippi
Sept. 6	Deming	New Mexico

As in the case of anthracnose, H. W. Barre (1) reports effective results from the sulphuric acid treatment of the seed. Not only is the seed disinfected but a more vigorous growth is obtained. Treated seed sends up plants from 5 to 7 days earlier than untreated seed and a higher yield results.

Recent literature:

Cited

1. Barre, H. W. Sulphuric acid treatment in South Carolina. U. S. Dept. Agr. Office Coop. Ext. Work, Extension Pathologist (mimeogr. 2: 110. Oct. 1924.

ROOTKNOT CAUSED BY HETERODERA RADICICOLA (GREEF) MUELL.

This was one of the less important troubles although it was serious locally and was complicated as usual by being commonly associated with plants affected with Fusarium wilt. Rootknot occurred in all cotton states but estimates of loss are available only from those in table 90.

Table 90. Estimated percentage loss from rootknot, 1924.

Percentage loss	States
3	New Mexico
2	North Carolina, Arkansas
1	Texas
Trace	Virginia, Alabama, Mississippi, Georgia, Arizona

BLIGHT CAUSED BY ASCOCHYTA GOSSYPII SYD.

This disease, hitherto reported only from Arkansas, appeared during 1924 in conspicuous and destructive amounts in parts of Virginia, North Carolina, and South Carolina. In a paper given before the Southern Division of the American Phytopathological Society at Atlanta, Georgia, February 1925, S. G. Lehman reported on the situation in North Carolina and presented climatalogical data correlating the outbreak with unusual moisture and temperature conditions. It is not unlikely that the fungus has been present in these states prior to 1924 and that the unusual and peculiarly favorable weather of the year was responsible for its appearance. The first part of the season was cold and wet and it was during this time that the disease assumed serious aspects. However, a change to dry and warmer weather resulted in the checking and final disappearance of the disease. In Virginia it was found in the southern counties of Brunswick and Greenville. In North Carolina it occurred in at least 33 counties scattered through the eastern and southern parts of the state. July 8 was the date on which the first specimens were received both from Virginia and South Carolina, and it was early in July that complaints began coming into the North Carolina Experiment Station from various parts of that state.

In a letter dated July 21, H. R. Rosen of Arkansas submitted some unpublished data of the late Dr. J. A. Elliott as follows:

> "Doctor Elliott found what he considered the same disease as on cotton on the following two species: Hibiscus lasiocarpos and H. militaris. Furthermore, he was able to produce the disease by artificial inoculations of the cotton fungus onto H. militaris."

OTHER DISEASES

Alternaria sp., leafspot - Florida, Mississippi, Tennessee, and Arkansas reported more or less Alternaria leafspot. Collaborators in the two latter states mention its association with plants suffering from potash hunger.

Cercospora althaeina Sacc., leafspot - This fungus was reported to the Plant Disease Survey for the first time. It occurred in southern Illinois and was reported by L. R. Tehon. It is distinct from Cercospora gossypina Cke. (Mycosphaerella gossypina (Cke.) Earle).

Corticium vagum Berk. & Curt., soreshin - This disease, in conjunction with angular leafspot and anthracnose, took an exceedingly heavy toll of seedlings in some of the Florida cotton sections. It was reported also from Louisiana, Texas, and New Mexico. In the latter state it was the cause of considerable damage according to R. F. Crawford.

H. R. Rosen (1) has recently reported successful results in the control of damping-off of seedlings on an experimental scale by the application of 0.25% solution of Uspulun to the soil at the rate of one gallon per square foot.

Literature cited:

1. Rosen, H. R. The control of damping off of cotton seedlings by the use of Uspulun. Science 60: 384. Oct. 1924.

Literature not cited:

Shearer, E. Soreshin. In experimental work on cotton 1922. Ann. Rept. Cotton Res. Bd. Min. Agr. Egypt 3: 27-37. 1924.

Lint stain - In South Carolina, during a period of wet weather at time of boll opening, various fungi attacked the lint causing it to become stained and reduced the quality. The loss did not appear to be great, however.

Malnutrition (non-par.) - Tennessee and Louisiana. In the latter state the dry season probably favored the trouble, according to Edgerton.

Mycosphaerella gossypina (Cke.) Earle, leafspot - Illinois, Florida, and Texas. In the former state it was more abundant that the angular leafspot.

Ozonium omnivorum Shear, rootrot - Texas, New Mexico, and Arizona reported rootrot. In Texas where it caused a loss of 5%, it was quite prevalent late in the season and was reported especially from the eastern half of the state. In New Mexico it was very prevalent in the Mesilla and Pecos Valleys. Some fields showed as high as 25% and the average damage for the state was placed at 5%. In Arizona, where it was considered the most serious cotton disease, the loss was placed at 8%.

Phyllosticta gossypina Ell. & Mart., leafspot - Florida and Illinois reported traces.

Puccinia hibisciata (Schw.) Kellerm., rust - Texas, prevalent in the Rio Grande Valley. Arizona, common in Santa Cruz Valley; specimens received.

Ramularia areola Atk., frosty mildew - Florida (first report from state).

Root disease (undet.) - Was very important locally in Mississippi and reported as follows by Mississippi collaborators:

> "Throughout the past season we have received several reports and specimens of cotton showing an arrested condition of the root system. Some of the plants have been of normal size and appearance with the exception of the root systems, which were very abnormal. Some of the plants have no tap root at all but have sent out long lateral roots. Others have short blunt roots which appear to have sloughed off and calloused over. We have been unable to find any disease present and have not determined the cause of this condition. Specimens submitted to J. J. Taubenhaus and B. M. Duggar, but their findings are negative for a disease-producing organism." (Neal and Wallace)

Wilt (undet.) - A blight or wilt of unknown cause was reported as causing very severe local damage in South Carolina. The disease is under investigation.

Reference:

Templeton, J. The effects of heat treatment of cotton seed on its germination and on the subsequent growth and development of the plants. Bul. Techn. & Sci. Serv. Min. Agr. Egypt 48: 1-9. 1924.

TOBACCO

WILDFIRE CAUSED BY BACTERIUM TABACUM WOLF & FOSTER

Massachusetts: Reported in a few seed beds from which it was transferred to the field. Dry weather has checked development of the disease and at present there is little trouble in evidence. (Osmun)

Connecticut: Less than usual so far in fields due to drought of July-August. Only have records of two cases in fields so far and neither of these serious. Summer too dry for serious injury even when present in fields. (Clinton)

New York: More than in 1923. In inspections made at different times of the year by Thomas and Wiant in Chemung County the following percentages of plants were found affected: 25, 100, 100, 32, 25, 4, 6, 8, 13, 2, 14, 100, 78, 91, 11, 19, 20, 29, 0, 0, 11. One field was found in Stuben County that showed 100% infection. It was so bad that the farmer considered plowing up the field. (Chupp)

Pennsylvania: Started in as a severe infection in seed beds but was checked by dry weather at transplanting. Not important. (Orton)

Maryland: Unusually severe in seed beds in Maryland this year. It was especially severe in the portion of the state where Anne Arundel, Calvert, and Prince Georges Counties meet and at least half of the beds in this region were affected. Although the disease has now reached all of the tobacco growing regions of the state, the proportion of diseased beds decreased with the distance from this center. The disease was found for the first time in St. Mary's County this year. The disease was checked more or less in all beds which were sprayed at intervals of a week to ten days with Bordeaux mixture or similar preparations. The success which the growers met in checking the disease depended upon the thoroughness and frequency of the applications. (Jehle)

Kentucky: Only about ten cases observed, several of these could be traced to certain lots of diseased seed. It is quite evidently being reduced rapidly in the state due, we believe, to the fact that the disease is so striking that most growers will not save seed from infected fields. (Valleau)

South Carolina: Found in two counties in localized areas. One field badly damaged. (W. D. Moore)

Georgia: Worse than last year; minor in some fields to 100% loss in others, depending upon seed source. The disease was scattered throughout the southern counties. (Boyd)

Florida: Gadsden County - There was much less seed bed infection this year than last and consequently less injury in the field. All beds which were steamed and seed treated were free from the disease. Second hand Connecticut cloth was steamed. (Tisdale)

Indiana: Serious in Spencer County and collected in Jefferson and Scott Counties. These are the first authentic reports for the state according to C. T. Gregory.

Wisconsin: Heavy damage in some cases, that is, almost total loss:

> possibly only up to 20% crop damage; season has been favorable for development; much more damage would have resulted had the tobacco crop been normal in growth. Only 50% of the crop in sight owing to other causes. (James Johnson, Sept. 1)

Anderson (2) and also Johnson (Wisconsin Agr. Exp. Sta. Bul. 362: 56-57. 1924) have reported overwintering of tobacco wildfire bacteria. Anderson's experiments show that the organism is not killed by the temperatures of Massachusetts winters but remains alive and virulent in diseased leaves hanging in sheds or fields, in dry fragments of diseased pods, on boards, sash, and in various other situations where they do not come into competition with other organisms. Johnson confirms this work and in addition points out that the refuse of other hosts may be a source of infection.

Johnson, Slagg, and Murwin (3) have reported a large number of other hosts belonging to several different families, for the wildfire organism.

Recent literature:

1. Anon. Recommendations for the control of wildfire. Connecticut Agr. Exp. Sta. Tobacco Sub-Sta. Bul. 4: 1-3. 1924.

2. Anderson, P. J. Overwintering of tobacco wildfire bacteria in New England. Phytopath. 14: 132-139. 1924.

3. Johnson, J., C. M. Slagg, and H. F. Murwin. Host plants of Bacterium tabacum. Phytopath. 14: 175-180. 1924.

4. Moore, E. S. Wildfire of tobacco in South Africa and control measures. Jour, Dept. Agr. South Africa 9: 211-215. Sept. 1924.

5. Thomas, H. E. Tobacco wildfire and tobacco seed treatment. Phytopath. 14: 181-187. 1924.

6. Valleau, W. D. The infection of tobacco plant beds by spitting. Science n. s. 59: 337-338. 1924.

BLACKFIRE CAUSED BY BACTERIUM ANGULATUM FROMME & MURRAY

Connecticut, Kentucky, Georgia, Florida, Indiana, and Wisconsin reported blackfire in 1924. Clinton states that successful reproduction of the disease by inoculation has not yet been obtained in Connecticut and, therefore, the exact cause of the angular leafspot in that state is somewhat doubtful although the symptoms are typical. In Kentucky it was of considerable importance and threatened complete destruction of the dark tobacco crop, however, at cutting time most fields appeared to be nearly free on account of the stripping off of the lower infected leaves. According to Valleau, seed treatment and sanitary practices were valueless in control in Kentucky as far as tests in the fields at the Experiment Station were concerned. Four percent loss was estimated for the state.

In the Gadsden County section of north Florida according to W. B. Tisdale, blackfire was more prevalent than in 1923. No infected seed beds were observed but some fields showed severe infection while others set with plants from the same beds were disease free.

In Indiana, blackfire was more widespread than the wildfire, and in Wisconsin, general infection occurred on fully three-fourths of the infested farms. Regarding it James Johnson says,

> "On account of its general distribution it is doing much more damage than wildfire. This is the first official recognition of the disease in Wisconsin. It has no doubt existed for a long time. We have difficulty in getting artificial infection with the organism. Season has been cool and wet with frequent storms."

Recent literature:

Valleau, W. D. The infection of tobacco plant beds by spitting. Science n. s. 59: 337-338. 1924.

BLACK ROOTROT CAUSED BY THIELAVIA BASICOLA (BERK. & BR.) ZOPF

New York, Kentucky, Florida, Ohio, Indiana, and Wisconsin reported this disease. According to Valleau it was worse than usual in Kentucky and the loss was considerable, largely because of low temperatures which prevailed. In Florida it was of minor importance. From Wisconsin, James Johnson reported:

> "Heavy damage from this disease general throughout the state. One half of a crop in sight, one-half of this loss may be attributed to black rootrot. Cold season favorable. Disease resistant strains showing up well."

MOSAIC (UNDET.)

Connecticut: About the usual amount, four reports. (Clinton)

Florida: Gadsden County - Only a few fields showed mosaic and in most cases then only on the sucker leaves. (Tisdale)

New York: Important in some fields. (Chupp)

Kentucky: About as usual, an average of 14% of plants infected. So far we have obtained no beneficial effects from the eradication of solanaceous weeds from the plant beds. Mosaic burn of burley was quite prevalent and was mistaken for wildfire. (Valleau)

Ohio: About the usual amount, 3 to 5% infection. (H. C. Young)

Indiana: Widespread and noted in most all fields, always more prevalent on second growth. In two cases 50% infection was found. In one of these the plants had grown in a tomato plant bed and in the other the weed carriers were noted in the bed. (Gregory)

Wisconsin: While the development of mosaic was marked in the few fields, it was strikingly less common that last year. (James Johnson)

Porto Rico: Common but not serious. (Cook)

An important contribution to the mosaic problem is that of James Johnson (2) who has infected tobacco plants with extracts from both mosaic and apparently healthy potato foliage. A mosaic symptom different from that of tobacco mosaic was obtained. A third symptom was obtained by a combination of tobacco and potato mosaic extracts on tobacco.

Kunkel (3) has found intracellular bodies in mosaic tissue of tobacco leaves resembling those formerly found on corn and Hippeastrum.

Recent literature:

1. Goldstein, B. Cytological study of living cells of tobacco plants affected with mosaic disease. Bull. Torrey Bot. Club 51: 261-273. June 1924.

2. Johnson, James. A virus from potato transmissible to tobacco. (Abstract) Phytopath. 15: 46-47. Jan. 1925.

3. Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. April 1924.

4. Olitsky, P. K. Experiments on the cultivation of the active agent of mosaic disease of tobacco and tomato. Science n. s. 60: 593-594. Dec. 1924.

5. ———————— Experiments on the cultivation of the active agent of mosaic disease in tobacco and tomato plants. Jour. Exper. Medicine 41: 129-136. Jan. 1925.

6. Scherffius, W. H. Tobacco mosaic. Some interesting experiments on a supposed disease in Turkish tobacco. Agr. Jour. Dept. Agr. Union South Africa 8: 33-34. 1924.

OTHER DISEASES

Bacterium solanacearum EFS., Bacterial wilt - Destructive in vicinity of Amsterdam, Georgia, according to B. B. Higgins.

Brown rootrot (undet.) - Connecticut and Wisconsin. In Connecticut one report of serious injury was received. In this case the grower was forced to give up that field for tobacco. Has been spreading in the field for some years. (Clinton)

In Wisconsin, James Johnson reports brown rootrot as very general in 1924 and causing almost as much damage as did black rootrot. It has not yet been proved to be the same as the Connecticut field disease.

Cercospora nicotianae Ell. & Ev., frogeye - Kentucky, South Carolina, Georgia, Florida, Porto Rico, and Indiana report frogeye. In the latter state it was the most widespread of the tobacco diseases. On the whole, however, it was relatively unimportant.

Fusarium sp., rootrot - Valleau of Kentucky reports that tobacco in many of their sections was very irregular in size and in many fields in the Burley Section growth was considerably retarded. The root system of affected plants nearly always showed severe injury, most of the new rootlets being dead and replaced by others, giving a somewhat bushy appearance to the root system. It was decidedly more prevalent than usual.

Heterodera radicicola (Greef) Muell., rootknot - Rather common in the Florida tobacco section and caused considerable injury in some fields. Common, especially on bright and cigar wrapper tobacco according to Tisdale.

Macrosporium tabacinum Ell. & Ev., white speck - Ohio.

Phyllosticta sp., leafspot - Porto Rico.

Phytophthora sp., - Causing disease in the seed bed was reported from Porto Rico.

Phytophthora nicotianae (Speg.) Van Breda de Haan, black shank - Reported by Tisdale from the Gadsden County, Florida section as follows: "Appeared in many new localities of the county and caused total loss of Connecticut round tip tobacco, even in cases where no signs of the disease were noted last year. Approximately 10 to 20% loss estimated for the county."

Ringspot (undet.) - Present in most fields of burley in Kentucky but not of much importance according to Valleau.

Frenching (undet.) - Several quite severe cases noted by Valleau in Kentucky.

Recent literature:

1. Anon. Krankheiten an tabaksämlingen. Deut. Landw. Presse. 51: 285-286. June 21, 1924.

2. D'Angremond, A. De veldschimmel (Oidium spec.) in de Vorstenlanden. (The field fungus (Oidium sp.) in the Vorstenland.) - Proefstat. Vorstenlandsche Tabak, Meded. 49: 7-25. 1924. (English summary)

3. Eyles, F. Some diseases of tobacco in Rhodesia. Rhod. Agr. Jour. 21: 747-749. Dec. 1924.

4. Hoffmann. Krankheiten an Tabaksämlingen. (Diseases of tobacco seedlings) - Deutsche Landw. Presse, 51: 285-286. 1924.

5. Johnson, J. Tobacco diseases and their control. U. S. Dept. Agr. Bul. 1256: 56. Oct. 13, 1924.

6. Palm. B. T., and S. C. J. Jochems. Andreaea deliensis n. gen., n. sp., de groote stapelschimmel van de Deli-Tabak. (Andreaea deliensis n. gen., n. sp., the large stack fungus of Deli Tobacco.) - Deli Proefstat. Medan-Sumatra Bul. 19: 20 pp. 1923. (English summary)

7. Palm, B. T., and S. C. J. Jochems. Invloed van peteh tjina (Leucaena glauca) op de stengelverbranding van Tabak. (The influence of peteh tjina (Leucaena glauca) on stem rot of tobacco) Vlugsch. Deli Proefstat. te Medan (Sumatra), 24: 4 pp. 1924.

8. Valleau, W. D. The infection of tobacco plant beds by spitting. Science, N. S. 59: 337-338. 1924.

SUGAR CANE

MOSAIC - (UNDET.)

Mosaic was reported to the Plant Disease Survey from Georgia, Florida, Mississippi, and Louisiana. In all of these states more of the disease occurred than last year, and the indications are that it is continuing to increase in prevalence. The following facts concerning the disease were reported by the Florida State Plant Board.

> "This disease has been found in cane fields in a number of West Florida counties. Efforts at eradication and to minimize the damage caused by the disease proved ineffective, mainly because of the indifference or inactivity of cane planters. It was difficult for them to realize that this disease, unless controlled, would occasion serious losses. Consequently farmers failed to cooperate in the project of eradication and declined to adopt the recommendations with respect to cultural practices to avoid loss. The result has been that the disease has become very firmly established in the earlier affected areas and the farmers are now appreciating the wisdom of the advice they refused to accept.
>
> "The spread of the disease, despite the adoption of quarantine precautions, has been steadily progressive and was expected. With the close of the present biennium 16 counties in North and West Florida are included in the quarantine rule of the Board which prohibits shipment of sugar cane from areas in which the mosaic disease has been found. It is believed that the utilization of this precaution will retard the rapid spread of the disease. In the meantime cane growers can be preparing for the inevitable invasion by securing and propagating varieties of sugar cane which are immune or highly resistant to the disease. The Board has endeavored to assist in this by planting in cooperation with the Agricultural Experiment Station a variety of cane, Cayana 10, which is resistant to the mosaic disease. During the fall of 1923, 35 carloads of seed cane of this variety were distributed free of cost to farmers in North and West Florida. The distribution was made mainly through the County Agricultural Agents. It is our hope that by this means adequate planting stock will be made available." (Florida State Plant Board, Quart. Bul. 9: 77-78. Jan. 1925.)

From Mississippi D. C. Neal reported:

> "There has been a widespread infection in the southern counties as usual but we do not have any estimate as to the amount of damage done. One field was reported to have a 25% infection. Mosaic was reported from the Counties of Kemper, Newton, Lauderdale, and Washington for the first time. It has not been found further north than the above mentioned counties."

In Louisiana, where serious deterioration occurred on account of disease, including mosaic, C. W. Edgerton reported from 5 to 10% reduction in yield from that disease. In a recent publication (3) he has pointed out that the loss from mosaic is very much of a question and a difficult thing to estimate or to make a satisfactory test of. However, he thinks it is doubtful if the disease produces a loss greater than 10% in Louisiana under present conditions and with the varieties that are now being grown. He points out that according to his observations, infected cane does not deteriorate progressively from year to year and calls attention to the comparatively light losses in the eastern part of the state where the disease has been established for a number of years, and to the heavier losses in the western part of the state where mosaic has more recently become prevalent. However, F. S. Earle (Australian Sugar Journal 16: 615-660. Dec. 5, 1924) thinks that the importance of cane mosaic in Louisiana is being underestimated and that it is the chief cause of decreased yields in the state.

Brandes (1) has recently reported on field inspections in three sugar cane districts of Louisiana during the years 1919 to 1920. The figures show considerably more mosaic in 1920 than in 1919, and a much smaller number of mosaic-free fields. In the same publication he compared the weights of canes from healthy and diseased plants of five varieties and found that diseased canes were from 10 to 38% lighter in weight than healthy ones.

Concerning losses in Hawaii the following figures for 1920 and 1921 have recently become available (5).

> "The losses estimated for the two crops harvested in 1920 and 1921 are as follows: For the Island of Kauai, 565 tons of sugar; for the Island of Oahu, 2,483 tons of sugar; for the Island of Hawaii, 3,298 tons of sugar; and for the Island of Maui, 11,724 tons of sugar. The loss on the four islands amounted to 18,071 tons, or an average yearly loss of a little over 9,000 tons. While no survey has been made to determine the amount of mosaic in the crops now growing, it is believed that the situation is much better than in 1920. This improvement is largely due to a decrease in the areas in Lahaina, Demerara 117, Striped Tip and Yellow Tip, and to increased planting of the more resistant varieties Demerara 1135 and Hawaii 109."

Concerning the cause of mosaic we are still in the dark. However, Kunkel (4) has recently found bodies in the diseased cane leaves similar to those he described as associated with corn and Hippeastrum. Cook (2) has also reported similar bodies in diseased canes.

From Porto Rico, Mel T. Cook reports that the disease is being controlled by the use of resistant varieties and by roguing.

Recent literature:

The following references do not constitute a complete bibliography of cane mosaic for 1924, but some of the most important, and those applying particularly to the United States, have been selected.

Cited

1. Brandes, E. W. Mosaic's role in limiting Louisiana yields. Effects of disease amply proven by data. Agricultural department active in search for new cane varieties. Facts about Sugar 18: 610-611. June 28, 1924.
2. Cook, Mel T. Studies on the cytology of sugar cane mosaic. (Abstract) Phytopath. 15: 45. 1925.
3. Edgerton, C. W., W. G. Taggart, and E. C. Tims. The sugar cane disease situation in 1923 and 1924. Louisiana Agr. Exp. Sta. Bul. 191: 1-44. Dec. 1924.
4. Kunkel, L. O. Further studies on the intracellular bodies associated with certain mosaic diseases. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 108-114. April 1924.
5. ———— Studies on the mosaic of sugar cane. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 115-167. April 1924.

Not cited

Anon. Mosaic disease eradication campaign. South African Sugar Jour. 8: 523-524. 1924.

Anon. Mosaic disease in Natal. Important communications from world's experts. South African Sugar Jour. 8: 269-271. 1924.

Anon. Mosaic disease of sugar cane. Trinidad's efforts to eradicate it. West India Comm. Circ. 39: 381. Sept. 25, 1924.

Barber, C. A. Experimental agriculture in Jamaica. The campaign against mosaic. Intern. Sugar Jour. 26: 474-476. Sept. 1924.

———— The present position as regards mosaic in Cuba. Intern. Sugar Jour. 26: 469-473. Sept. 1924.

Calvino, M. Doce puntos relacionados con el mosaico de la Cana y el modo de combatirlo. (Twelve points relating to the mosaic of sugar cane and the means of combating it.) Rev. Agr. Com. y Trab. (Cuba) 12: 6-7. 1924.

Cook, M. T. The control of sugar cane mosaic. Methods successfully applied by cane growers in Porto Rico from researches made by Experiment Station. Facts about Sugar. 20: 67-68. Jan. 17, 1925.

Cross, W. E. The problem of sugar cane yields in Louisiana. Head of Tucuman station discusses further his reasons for attributing low yields to mosaic disease. Facts about Sugar 19: 181, 184-185. Aug. 23, 1924.

———— La importancia de la enfermedad del mosaico en Louisiana y las posibilidades de exito de las 'Canas de Java' en ese pais. (The importance of mosaic diseases in Louisiana and the prospect of success of 'Java Sugar-canes' in that country.) Rev. Indus. y Agric. de Tucuman, 15: 1-2, 22-28. 1924.

Earle, F. S. Sugar cane mosaic and sugar cane chlorosis. Superficial resemblance often a cause of confusion. How to distinguish chlorosis from mosaic. Facts about Sugar 19: 372. Oct. 18, 1924.

Edgerton, C. W. Selecting for resistance to the sugar cane mosaic. (Abstract) Phytopath. 15: 45-46. 1925.

——————— and W. G. Taggart. Tolerance and resistance to the sugar cane mosaic. Jour. Agr. Res. 29: 501-506. Nov. 15, 1924.

Pritchett, G. H. Points from cane affected with mosaic disease versus points from healthy cane at Hacienda Soledad owned by Mr. Jose Yusay. Sugar News 5: 243-247. May 1924.

Redpath, W. H. A planter's experience with mosaic disease and the planting of Uba cane. Jour. Jamaica Agr. Soc. 29: 18-21. Jan. 1925.

Rosenfeld, Arthur H. A beneficial aspect of the sugar cane mosaic disease. Internat. Sugar Jour. 26: 191-195. 1924.

——————— The cause of mosaic disease of sugar cane. A step toward the solution of this mystery. Internat. Sugar Jour. 26: 535-536. Oct. 1924.

Storey, H. H. Diseases of sugar-cane of the mosaic type in South Africa. Part I. True mosaic, mottling, or yellow stripe disease. - Jour. Dept. Agr. South Africa 9: 108-117. 1924.

United Fruit Company. Agricultural Research Department. The mosaic disease of sugar cane in 1923.

Veve, R. A. Overcoming the mosaic disease at Fajardo. A Porto Rican experience in dealing successfully with the disease by use of the roguing system. Facts about Sugar 18: 468. May 17, 1924.

REDROT CAUSED BY COLLETOTRICHUM FALCATUM WENT.

Redrot was common in Mississippi, Louisiana and Porto Rico. In the Gulf States it was particularly serious early in the season, reducing germination of the seed cane and impairing the stand. From 5 to 10% reduction in yield was estimated by Edgerton for Louisiana, largely on account of poor stands. Concerning the Louisiana situation Edgerton (1) writes as follows:

> "In the season of 1923, the redrot infection was as high as it has been seen in Louisiana. The very wet season combined with the heavy borer infestation made conditions ideal for the spread of the disease. Examinations made at the mills at grinding time showed this disease in great abundance. This very heavy redrot infestation was one of the causes of the very low sucrose content of the juice in 1923.
>
> "This very heavy redrot infection was also partly responsible for the very poor stands obtained in the spring of 1924. Trips were made over a greater portion of the sugar belt during the early part of the season. Hundreds of the old seed stalks which failed to germinate were dug up and examined. The percentage of these

stalks showing typical redrot was very large, apparently 75% or more. Furthermore, on digging up the old stubbles that failed to grow, the same condition was found. These were just as severely infected with the redrot as were the planted stalks. As it has been demonstrated that redrot will cause just such a decrease in germination, the presence of such a heavy infection explains very largely the poor, thin stands of 1924.

"Notwithstanding the fact that the spring started with a very heavy redrot infection, there was very little spread of the disease in growing cane during the season of 1924. This is easily accounted for by the very dry season which prevented the development and spread of the redrot fungus and by the light borer infestation during the early summer months. Consequently at the end of the season there was very little redrot. The very high sucrose analyses that were obtained at the mills would not have been possible with a heavy redrot infection."

Recent literature:

Cited

1. Edgerton, C. W. The sugar cane disease situation in 1923 and 1924. Louisiana Agr. Exp. Sta. Bul. 191: 16-17. Dec. 1924.

Not cited:

Shepherd, E. F. Les maladies de la canne à sucre à Maurice L. 'Redrot'. Rev. Agr. Ile Maurice 13: 59-61. Jan.-Feb. 1924.

ROOTROT CAUSED BY VARIOUS FUNGI

The complicated rootrot troubles of sugar cane were reported particularly from Louisiana and Porto Rico. Some of the organisms which have been reported as causing rootrots are _Marasmius sacchari_ Wakker, _Pythium_ sp., _Rhizoctonia_ spp., and snails. Concerning the latter Rands (1) has recently reported that snails injure the roots and predispose the plants to rootrot. _Thielavia paradoxa_ (Berk. & Br.) Zopf and _Himantia stellifera_ Johnston were also reported by Cook from Porto Rico as causing rootrot.

Recent literature:

Cited

1. Rands, R. D. Snails as predisposing agents of sugar cane "root disease" in Louisiana. Jour. Agr. Res. 28: 969-970. 1924.

Not cited

Small, W. A Rhizoctonia causing root disease in Uganda. Trans. Brit. Mycol. Soc. 9: 152-166. 1924.

OTHER DISEASES

Bacterium vascularum EFS., gumming disease - Reported by Cook from Porto Rico as severe in a few localities. Resistant strains are giving good results.

Cercospora vaginae Krueger, red spot of leaf sheath - Porto Rico. Common.

Cytospora sacchari Butler - Porto Rico. Occasional.

Helminthosporium sacchari Butler, eye leafspot - Mississippi and Porto Rico. In Porto Rico it was severe, especially on the variety D 109.

Leptosphaeria sacchari Van Breda de Haan, ringspot - Florida and Porto Rico. Common.

Melanconium sacchari Mass., - Florida and Porto Rico.

Phyllosticta sp., probably *Phyllosticta sacchari* Speg., leafspot - Was reported to the Survey from Porto Rico and for the first time from southern Georgia. In Georgia it was noted as serious in only two or three fields near Pavo. One field showed 100% plants affected with many leaves dying somewhat prematurely. In Porto Rico the disease was said to be widespread.

Plasmodiophora vascularum Matz, - Locally severe in parts of Porto Rico on the variety D 109 according to Cook.

Recent literature on other diseases:

The following references do not constitute a complete bibliography of other cane diseases for 1924, but some of the most important and those applying to the United States have been selected.

Anon. La enfermedad del sereh en Java. Industr. Azucarera 29: 114-116, 245-247. Mar.-Apr. 1924.

Anon. Menace of streak disease. Need for selected plant cane. South African Sugar Jour. 8: 549. 1924.

Agee, H. P. Resistance to disease and adverse conditions by hardy sugar cane types. Louisiana Plant. 72: 75-76. Jan. 26, 1924.

Barber, C. A. Researches on the sereh disease in Java. Intern. Sugar Jour. 26: 18-21. Jan. 1924.

——— Sugar cane diseases in Australia and their control. Intern. Sugar Jour. 26: 522-528. Oct. 1924.

Brandes, E. W. Important sugar cane diseases not present in the United States. In the reference book of the sugar industry of the world. 2: 79-81. July 1924.

——— Sugar plant investigations. Work of the Government's office in Plant Industry Bureau at Washington described. Facts about Sugar 18: 230. March 8, 1924.

Ceresa, G. El tratamiento de los trozos de cana con agua caliente. Chaparra Agr. 1: 11-13. June 1924.

Cook, M. T. Helminthosporium leafspot of sugar cane in Porto Rico (Preliminary paper). Jour. Dept. Agr. Porto Rico 8: 5-10. Oct. 1924.

Cottrell-Dormer, W. Diseases and pests of sugar cane. Austral. Sugar Jour. 16: 379-380. Sept. 5, 1924.

——— Cane diseases in Lower Burdekin areas. Austral. Sugar Jour. 16: 231, 233, 234. July 1924.

Cottrell-Dormer, W. Sugar pests and diseases in the Mackay district. Queensl. Agr. Jour. 21: 363-368, 428-434. May-June 1924.

——— Sugar cane disease in the south. Austral. Sugar Jour. 16: 596-597, 604-605. 1924.

Cross, W. E. Present needs in cane disease control. Intern. Sugar Jour. 27: 26-31. Jan. 1925.

Edgerton, C. W. The sugar cane disease situation in Louisiana. In the reference book of the sugar industry of the world 2: 82-83. July 1924.

Fawcett, G. L. La enfermedad de las raices en la cana de azucar. Hacienda 19: 174-175. June 1924.

Kunkel, L. O. Histological and cytological studies on the Fiji disease of sugar cane. Hawaiian Sugar Plant. Assoc. Exp. Sta. Bul. Bot. Ser. 3: 99-107. April 1924.

Lee, H. A. Present needs in cane disease control. Intern. Sugar Jour. 26: 543-545. Oct. 1924.

——— and W. C. Jennings. Bacterial red stripe disease of tip canes. Hawaiian Sugar Plant. Assoc. Exp. Sta. Circ. 42: 1-4. April 1924.

Lyon, H. L. Cane pathology. In Rep. Comm. in Charge Exp. Sta. Proc. Hawaiian Sugar Plant. Assoc. 43: 18-22. 1924.

North, D. S., and H. A. Lee. Java gum disease of sugar cane identical to leaf scald of Australia. Phytopath. 14: 587. Dec. 1924.

Shepherd, E. F. S. Le charbon de la canne a sucre. Rev. Agr. Ile Maurice 14: 107-108. Mar.-Apr. 1924.

——— La maladie de la pointe dans la canne a sucre. Rev. Agr. Ile Maurice 15: 146-147. May-June 1924.

——— Les maladies de la Canne a sucre a Maurice. I. 'Red rot'. (Diseases of the Sugar-cane in Mauritius. I. 'Red rot'.) Rev. Agr. de l'Ile Maurice, 13: 59-61. 1924.

——— La maladie de la gomme. (The gumming disease.) - Rev. Agr. de l'Ile Maurice, 16: 207-208. 1924.

Storey, H. H. Streak disease in Uba cane. Louisiana Plant. 73: 268-270. Oct. 4, 1924.

——— The influence of streak disease upon the yield of Uba Cane. South African Sugar Jour. 8: 519-522. 1924.

SUGAR BEET

Only a very few collaborators sent in reports on the diseases of the sugar beet during 1924 and neither are any reports at hand from pathologists working particularly on the disease of this crop. These summaries, therefore, will have to be based largely on published results.

CURLY TOP (UNDET.)

R. F. Crawford of New Mexico reported more curly top than usual with considerable damage, estimated at about 15% of the crop. It occurred particularly in Dona Ana County. C. W. Hungerford of Idaho makes the statement that it is important every year but seemed to be less severe in 1924 than in 1923. The reduction in yield for Idaho was placed at 6%.

A recent development of significance in the curly top problem has been the production of the disease by direct artificial inoculation. This was reported by H. H. P. Severin (3 & 4) and also by Carsner and Stahl (1). Severin inoculated the expressed juice from the leaves and roots of diseased beets into the crown of healthy beets and produced typical curly leaf symptoms in 9 out of 100 beets inoculated. When noninfective beet leaf hoppers were allowed to feed on the inoculated beets after curly leaf developed they transmitted the disease to healthy beets. Severin reported that the causative agent, whatever it may be, is generally distributed throughout the foliage and root. That Bacillus morulans is the cause of curly top is improbable, according to Severin, since attempts to produce curly leaf by contaminating the mouth parts of noninfective leaf hoppers with cultures of B. morulans were unsuccessful. Other experiments were run to determine the rapidity of distribution of the infective principle. The rapidity with which it traverses the beet leaf seems rather remarkable. Severin found that the shortest time required for it to travel through a beet petiole seven inches long was one-half hour at a mean temperature of 103.5° F.

Carsner and Stahl (1 & 2) have reported progress in the selection of curly top resistant strains. They have obtained some evidence pointing toward the possibility that the passage of the infective agent through the resistant plant Chenopodium murale may attenuate or modify it in some way.

Recent literature:

1. Carsner, Eubanks, and C. F. Stahl. Progress report on curly-top of sugar beet. (Abstract) Phytopath. 14: 122-123. 1924.

2. ——— Studies on curly-top disease of sugar beet. Jour. Agr. Res. 28: 297-320. April 26, 1924.

3. Severin, H. H. P. Curly leaf transmission experiments. (Abstract) Phytopath. 14: 123. 1924.

4. ——— Curly leaf transmission experiments. Phytopath. 14: 80-93. 1924.

NEMATODE, HETERODERA SCHACHTII SCHMIDT

During the past year Rensch (1 & 2) has reported on a method of nematode eradication which makes use of certain preparations, the names of which are not given, applied to the soil before the beets are planted. These preparations have an effect similar to that of the excretions from beet roots in that they stimulate the emergence of nemas which, after emergence, die from lack of a proper host. In this respect these preparations to some extent resemble chicory which is known to have a similar secretion from its roots but which is not a suitable host for the nemas.

Recent literature:

1. Rensch, B. Control of sugar beet nematode. New method successfully used in German experiments utilizes attractive effect of certain plant secretions. Facts About Sugar. 19: 132-133. Aug. 9, 1924.

2. ———— Eine neue methode zur bekämpfung der rübennematoden. Mitt. Deut. Landw. Ges. 39: 412-414. May 31, 1924.

ROOTROTS CAUSED BY PHOMA BETAE (OUD.) FRANK AND RHIZOCTONIA SP.

Ohio, Michigan, Wisconsin, Iowa, Montana, and Idaho reported trouble from these rootrots. Concerning the situation in Michigan, G. H. Coons reported as follows:

> "Sugar beets in Michigan suffer chiefly from rootrots caused by the complex, as yet not surely distinguishable in the field, Rhizoctonia, Pythium, Phoma, Aphanomyces, etc. These parasites cause poor stands and rotting of the half-grown beets. The latter is a 'hand-over' from infection in the seedling stage. The present season showed about 5% loss in stand, and 10% loss in beets half to full grown, chiefly from Phoma and Rhizoctonia. Determining relative importance between these organisms is not possible with present knowledge and in absence of adequate culture work on specimens. The rather extensive development of Phoma rot is somewhat unusual for Michigan. The Rhizoctonia rot took the form of rots of the feeding roots, leading to stunting of the beets, rather than the typical canker form with cracking of tops. Average yield was low - 7 tons per acre - but this was compensated by very high sugar - 18 to 20%. We believe the figure, 15%, conservative as to actual loss for the state. Without the compensation of high sugar, the loss would have been, on the strict tonnage, more nearly twice this figure."

Caroline Rumbold (3) has shown that treatment of the seed with formaldehyde vapor and steam is effective in increasing the tonnage of beets in the irrigated sections of the West. This effect is possibly due to elimination of seed borne Phoma betae and other fungi. The sugar beet seed balls are exposed for twenty minutes to a mixture of formaldehyde vapor and steem with a temperature of 140° F. (60° C). The seed are not injured and have been found to be viable four years after treatment.

Recent literature:

1. Coons, G. H. Root diseases of the sugar beet. Their causes and prevention. Conditions favorable to parasites that produce damping off. Facts About Sugar 18: 251-253. March 15, 1924.

2. Müller, H. C., E. Molz, and K. Muller. Ueber die Bekämpfung des Wurzelbrandes der Ruben durch Saatgutbeize. (The control of root rot of beets by seed disinfection) Deutsche Landw. Presse 51: 62. 1924.

3. Rumbold, Caroline. Sugar beet seed disinfection with formaldehyde vapor and steam. Facts about Sugar 18: 322-324, 352-354. April 1924.

OTHER DISEASES

Actinomyces scabies (Thax.) Güssow, scab - Idaho, unimportant.

Bacterium tumefaciens EFS. & Town., crowngall - Iowa, very slight.

Cercospora beticola Sacc., leafspot - Less than in 1923 was reported from Michigan and Iowa, but more than usual was estimated for Wisconsin. One percent loss was estimated for the latter state.

Recent literature:

Gabotto, L. La Cercospora beticola nel 1924. Il Coltivatore 71: 108-112. Feb. 1925.

Schenck, Erna. Ueber das Auftreten einer Hypochnusart auf Zuckerrübe. (The occurrence of a species of Hypochnum on sugar beet.) - Centralbl. fur Bakt., Ab. 2, 61: 11-18, 317-322. 1924.

MISCELLANEOUS VEGETABLES

JERUSALEM ARTICHOKE

Bacterium sp., bacterial rot - Considerable damage to tubers in experimental plot at Gainesville, Florida. (Weber)

Sclerotium rolfsii Sacc., stemrot - Florida, attacked plant stalks near surface of the soil, quickly girdling and killing them. Not important. (Weber)

ASPARAGUS

Botrytis sp., blight - Illinois.

Cercospora caulicola Wint., leafspot - Florida, not common but severe infection where found. (Weber)

Cercospora sp. - Causing leaf and stem spot was reported from California (2).

Fusarium sp., stemrot - Reported from Pennsylvania causing tips to die back soon after they pushed through the soil. Found in New Jersey where it was reported as causing the plants to become stunted and die; from Illinois it was reported as causing lesions on the branches.

Leopard spot (undet.) - South Carolina, minor importance.

Puccinia asparagi DC., rust - 1924 was apparently favorable for the development of rust. In Connecticut, New Jersey, and Delaware it was said to be quite severe, at least in some fields. In the latter state the heaviest infection for the past four years was observed. The disease was reported from 13 widely scattered states, from Connecticut to North Dakota and New Mexico.

Recent literature:

1. Schermerhorn, L. G. New varieties of asparagus. Rust resistant strains are promising. New Jersey State Hort. Soc. News 5: 82. March 1924.

2. Smith, E. H. Some diseases new to California. (Abstract) Phytopath. 14: 125. Feb. 1924.

BEET

Actinomyces scabies (Thax.) Gus., scab - New Jersey, Ohio, Wisconsin, and North Dakota. Unimportant in all cases.

Cercospora beticola Sacc., leafspot - Reported from a large number of the eastern states. In general it was of slight importance although in local sections it caused some damage.

Heterodera radicicola (Greef) Muell., rootknot - Georgia, Florida, Texas, Washington.

Phoma betae (Oud.) Frank, rootrot and leafspot - Illinois and Washington. Seen only as a leafspot in Illinois. First report from that state.

Sclerotium rolfsii Sacc., stemrot - Florida.

Uromyces betae (Pers.) Lév., rust - In 1924 this disease was found for the first time in Oregon. The only other states that have reported the disease to date are Colorado and California. H. P. Barss wrote as follows on September 20:

> "Serious attack found in this small garden (Lincoln County) on table beet and Swiss Chard but not on a curly variety of Chard. First record from Oregon. Not observed last year. Not noticed in other gardens in Newport. Seed secured from local grocer, source unknown. Season driest on record. Has not been reported to Experiment Station from any other locality."

CARROT

Alternaria radicina Meier, Drechs., & Reddy, blackrot - New York, important in storage houses.

Bacillus carotovorus L. R. Jones, softrot - New York, Illinois and Colorado. Said to be causing actual field losses in Illinois.

Botrytis sp. - Graymold was reported by Heald and Dana (Trans. Amer. Microsp. Soc. 43: 136-144. July 1924) as having been found in storage cellars in Whitman County, Washington.

Cercospora apii carotae Pass., leafspot.- Serious in Indiana as a leaf and stem blight in market gardens.

Heterodera radicicola (Greef) Muell., rootknot - Florida.

Macrosporium carotae Ell. & Langlois, leafblight - Always important on Long Island, N. Y., according to Chupp; also reported from southern New Jersey, Florida, and Porto Rico.

Mosaic (undet.) - Michigan, 80% found in certain seed stocks grown at the college, it was taking the form of witches' broom production. (Coons)

Rhizoctonia sp., stemrot - New York, Florida, and Kansas. In Florida several instances of serious damage to roots were noted.

Rio Grande disease (undet.) - Texas (see lettuce).

Sclerotinia intermedia Ramsey, rootrot - This fungus was isolated from roots of carrot in February 1921 on material collected in the Chicago market and was named by Ramsey (1).

White heart or rabbit ear - New York. A minor disease of carrot similar to the white heart or rabbit ear (Rio Grande disease) of lettuce. Occurred in the Elba Muck district of New York but did little injury. (Felix & Chupp)

Literature:

1. Ramsey, G. B. Sclerotinia intermedia n. sp. A cause of decay of salsify and carrots. Phytopath. 14: 323-327. July 1924.

EGGPLANT

Alternaria solani (Ell. & Mart.) Jones & Grout, leafspot - Pennsylvania, Delaware, Florida.

Ascochyta lycopersici Brun., leafspot - Illinois.

Bacterium solanacearum EFS., bacterial wilt - Georgia, Florida, and Porto Rico; causing considerable local damage. In Florida certain fields were observed where 10% of the plants were killed before the fruit set.

Botrytis sp., wilt - Washington.

Diplodia sp., fruitspot - Florida.

Mosaic (undet.) - Florida.

Phomopsis vexans (Sacc. & Syd.) Harter, leafspot and fruitrot - New Jersey, Delaware, Maryland, Georgia, Florida, Indiana, Illinois, Iowa, Missouri, and Porto Rico. In New Jersey, Long Purple was much more resistant than Black Beauty and transmission by means of seed was again demonstrated. In other states it was of considerable importance locally.

Verticillium alboatrum Reinke & Berth., wilt - New Jersey, Delaware, and Pennsylvania. The New Jersey Department of Plant Pathology reports that Verticillium alboatrum was isolated from eggplant, okra, chrysanthemum, rose, and peach, and inoculated into eggplants through punctures below ground, producing typical eggplant wilt in every case. A culture of the fungus isolated and verified by C. W. Carpenter, formerly with the Bureau of Plant Industry, and Verticillium isolated by G. F. Gravatt from sugar maple, also produced the disease.

Literature:

1. Cook, M. T. A bacterial wilt of eggplants (Preliminary paper). Jour. Dept. Agr. Porto Rico 8: 15-16. Oct. 1924.

2. ———— Two new bacterial diseases. (Abstract) Phytopath. 15: 55. Jan. 1925. (Wilts of eggplant and cosmos)

GLOBE ARTICHOKE (CYNARA)

A serious disease caused by a species of Oidium was observed in 1923 in Algeria and reported in 1924 (1). The crop was reduced from 150,000 to 35,000 heads. This powdery mildew is not known to occur in the United States.

A rot induced by a Botrytis of the cinerea type, causing serious losses of shipments of globe artichoke buds from California, has recently been described by Link and Bailey (2).

Literature:

1. Anon. Maladies de l'Artichaut. (Diseases of the Artichoke.) La Vie Agric. et Rurale 24: 392. 1924.

2. Link, G. K. K., and A. A. Bailey. Botrytis rot of the globe artichoke. Jour. Agr. Res. 29: 85-92. July 15, 1924.

OKRA

Fusarium vasinfectum Atk., wilt - Georgia (2% loss), Texas (1% loss).

Heterodera radicicola (Greef) Muell., rootknot - Georgia, Mississippi, and Texas.

Ozonium omnivorum Shear, rootrot - Texas.

Phyllosticta sp., leafspot - Illinois.

Rhizoctonia sp., rootrot - Texas.

Verticillium alboatrum Reinke & Berth., wilt - New York and New Jersey. In the latter state this disease was very important and more was present then last year. On account of it the growing of okra has been discontinued in some sections. An estimate of 40% reduction in yield of the crop for the state was made by W. H. Martin.

PARSLEY

Cercospora sp., leafspot - New Jersey.
Septoria petroselini Desm. - New Jersey.

PARSNIP

Cercospora apii pastinacae Farl., leafspot - Indiana, Illinois and Missouri.

Ramularia pastinacae (Karst.) Lindr. & Vester., leafspot - New York, common but not destructive.

Yellows (undet.) - South Dakota.

PEANUT

Cercospora personata (Berk. & Curt.) Ell. & Ev., leafspot - North Carolina, South Carolina, Georgia, Florida, and Louisiana. General for the most part, not serious.

Cladosporium sp., leafmold - Florida.
Ozonium omnivorum Shear, rootrot - Texas.
Rhizoctonia sp., damping off - Florida, common.
Sclerotium rolfsii Sacc., stemrot - Florida, common; Texas, prevalent.

Literature:

1. Anon. Rosette disease in peanuts. Jour. Dept. Agr. South Africa, 8: 9. Jan. 1924.

2. Hartley, Carl. Varietal tests of peanut (Arachis hypogaea) for wilt resistance. (Abstract) Phytopath. 15: 55. Jan. 1925.

3. Maublanc, Andre. Les maladies de l'arachide. Agron. Colon. 10: 1-12. Jan. 1924.

4. Seumatu, N. Ueber eine Botrytiskrankheit der Erdnuss (Arachis hypogaea L.). (A Botrytis disease of the ground nut (Arachis hypogaea L.).) - Japanese Jour. of Botany 2: 35-37. 1924.

PEPPER

Bacterium solanacearum EFS., bacterial wilt - Texas.

Bacterium vesicatorium Doidge, blackspot - Florida. Found in 1923 to be very severe in a field near Gainesville. Not common. (Weber)

Botrytis sp., graymold rot - Connecticut, Virginia.

Cercospora capsici Heald & Wolf, leafspot - Georgia, Florida (often severe), Texas (trace), and Porto Rico (severe).

Fusarium sp. Fusarium wilt of Chile pepper was serious in parts of New Mexico and Arizona.

Glomerella piperata (Ell. & Ev.) Spauld. & Schrenk, anthracnose - Georgia, Mississippi, Porto Rico, and Philippine Island. From the Philippine Islands G. O. Ocfemia (Philippine Agr. 13: 163-166. Sept. 1924) reports as follows:

> "First collected June 2, 1924, after the first hard rains following the dry season of this year. At the time the specimens were collected actual counts of diseased fruits showed that from 50 to 75% of the crop was infected and was absolutely useless."

Heterodera radicicola (Greef) Muell., rootknot - New Mexico.

Macrosporium sp., fruitrot - Illinois, Wisconsin.

Mosaic (undet.) - New Jersey, Florida, and Indiana. In Florida it was the most severe disease of peppers.

Ozonium omnivorum Shear, rootrot - Texas.

Sclerotium rolfsii Sacc., blight - Georgia, Mississippi, Louisiana, and Philippine Islands.

Sclerotinia sclerotiorum (Lib.) Mass., twig blight - Florida. Caused killing of plants in one field at least, by attacking tips of branches and gradually killing them back. (Weber)

Literature:

1. Higgins, B. B. The blossom-end rot of pepper. (Abstract) Phytopath. 15: 50. Jan. 1925.

2. Trotter, A. "Cancrene pedale" del peperome e melanzana nella campanis (Capsicum annuum e Solanum melongena) Riv. Patol, Veg. 14: 125-130. Aug. 1924.

RHUBARB

Ascochyta rhei Ell. & Ev., leafspot - Connecticut, New Jersey, Delaware, and South Dakota.

Phyllosticta sp., crownrot - Pennsylvania, slight but spreading in 1924. Indiana, severe in Vanderburg County.

Phyllosticta straminella Bres., leafspot. New York, very common on Long Island. Pennsylvania.

Literature:

Millard, W. A. Crown rot of Rhubarb. Univ. Leeds and Yorkshire Council for Agric. Educ. Bul. 134: 28 pp. 1924.

SALSIFY

Albugo tragopogonis (Pers.) Gray, white rust - New York, Colorado, and Washington.

Erysiphe cichoracearum DC., powdery mildew. Washington.

Sclerotinia intermedia Ramsey, rootrot - Found by Ramsey (1) occurring on decayed roots of salsify on the Chicago market in 1920.

Literature:

1. Ramsey, G. B. Sclerotinia intermedia n. sp. A cause of decay of salsify and carrots. Phytopath. 14: 323-327. July 1924.

SPINACH

Cercospora flagelliformis Atk., leafspot - Georgia. First report from that state.

Colletotrichum spinaciae Ell. & Hals., anthracnose - Texas.

Fusarium sp., rootrot.- New York.

Mosaic (undet.) - New York, New Jersey.

Peronospora effusa (Grev.) Ces., downy mildew - Connecticut, New York, New Jersey, Virginia, Texas, and New Mexico. The following reports are of interest.

> New York: Wayne County - Spinach mildew has been found only on the variety King of Denmark and the indications are that it came in with the seed. No mildew has been found on any wild host on the muck. (Newhall, June 9)
>
> Peronospora effusa has been found in abundance on Chenopodium album in and around fields of Spinacia oleracea but did not seem to spread to the latter. The reverse has also been noted indicating the distinctness of these mildews. (Newhall, July 14)
>
> New Jersey: In portion of one field where manure was applied in fall, the trouble was slight - where manure applied just before planting the disease was much more abundant. (Dept. Pl. Path.)

Phyllosticta chenopodii Sacc., leafspot - Delaware.

Literature:

1. Geise, F. W. The development of blight resistant spinach. Rept. Maryland Agr. Soc. and Maryland Farm Bur. Feb. 8: 351-357. 1924.

2. Schoevers, T. A. C. X-organisms in diseased spinach roots. Rept. Intern. Conf. Phytopath. & Econ. Entom. Holland 1923: 116. 1923.

NEW ZEALAND SPINACH (TETRAGONIA)

Cercospora sp., leafspot. Caused spotting of older leaves in parts of Florida and was also reported from Indiana.

SWISS CHARD

Bacterial canker (undet.) - J. J. Taubenhaus of Texas has furnished the following note concerning this disease which heretofore has not been reported to the Plant Disease Survey.

> "Swiss chard (Beta species) is a variety of beet which produces large edible foliage. It is extensively grown in Texas as a truck or garden crop during the winter and spring months. The leaves are sold in bunches and consumed the same way as spinach. This plant is often affected by a stalk canker which seems to be new. The trouble is characterized by dark, sunken, scattered spots which may be found at the base of the leaf stalk or anywhere on the fleshy petiole. Frequently these cankers work deeply into the tissue thereby causing the leaf stalk to fall over and to break. Occasionally infection extends throughout the entire length of the midrib causing the leaf to die prematurely.
>
> "Cultures of the diseased material were made and a bacterial organism repeatedly isolated which greatly resembled the one described by Brown and Jamieson as Pseudomonas aptatum Brown and Jamieson. This organism was found by them to be pathogenic to beets, nasturtiums, beans, lettuce, pepper, and eggplants. The general gross characteristics of the Pseudomonas as isolated from the Swiss Chard were found to be as follows: Aerobic, smooth, white colonies on beef agar plates with the substratum changing to yellowish green. Alkaline reaction in litmus milk. Liquefies gelatin and has no diastasic action on potato starch; stains with all basic analin dyes and is gram negative; tolerates considerable acid. The rods are short, motile, with bipolar flagella. There are no spores or capsules formed and involution forms are rare. No inoculations were made with the Swiss chard organism on either the beet or nasturtium. However, inoculations carried out with the Swiss chard organism on healthy Swiss chard stalks reproduced the disease."

Cercospora beticola Sacc., leafspot. - Pennsylvania, Delaware, Texas, Indiana, Illinois, and Colorado.

Mr. G. M. Darrow,
Horticulture & Pomology,
Bureau of Plant Industry.